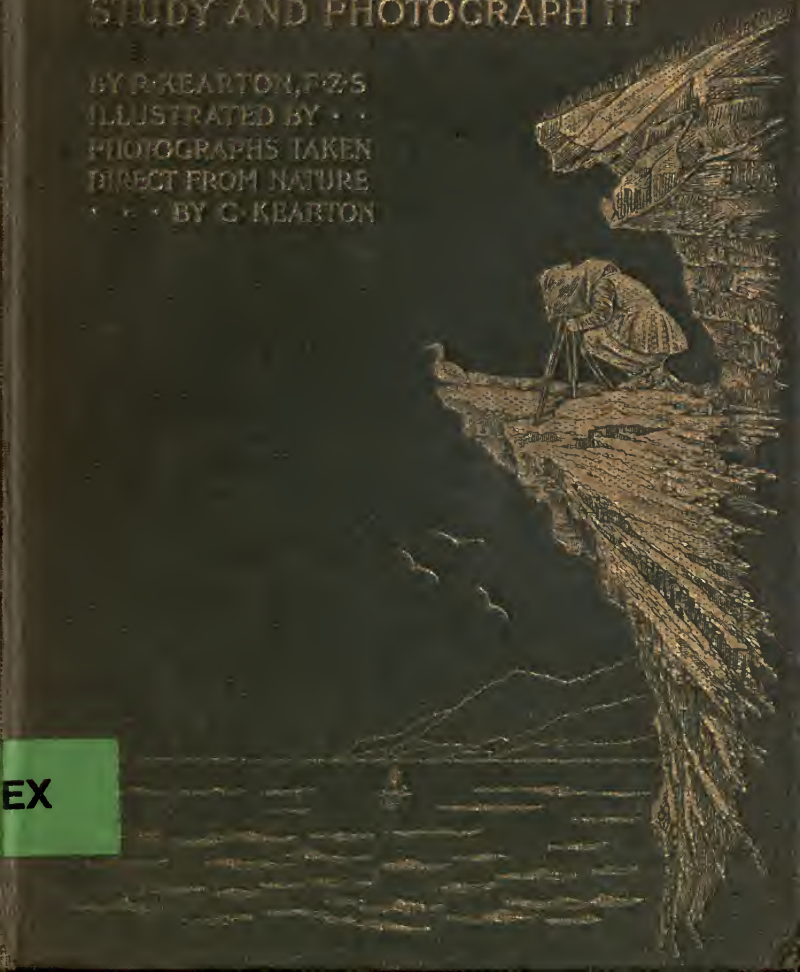
WILD LIFE AT HOME
HOW TO STUDY AND PHOTOGRAPH IT

BY R·KEARTON, F·Z·S
ILLUSTRATED BY · ·
PHOTOGRAPHS TAKEN
DIRECT FROM NATURE
· · · BY C·KEARTON



EX

Ex Libris
C. K. OGDEN

2/6

8

1/6 11

WILD LIFE AT HOME

Works by R. Kearton, F.Z.S.

With Nature and a Camera. Illustrated by a Special Frontispiece and 180 Pictures from Photographs taken direct from Nature by Cherry Kearton. Buckram gilt, 21s.

British Birds' Nests: How, Where, and When to Find and Identify Them. With nearly 130 Illustrations of Nests, Eggs, Young, etc., from Photographs by C. Kearton. 21s.

Birds' Nests, Eggs, and Egg-Collecting. Illustrated with 22 Coloured Plates of Eggs. *Revised and Enlarged Edition.* Cloth gilt, 5s.

Cassell & Company, Limited, *London; Paris, New York and Melbourne.*

MALE BEARDED TIT FEEDING ITS YOUNG.

WILD LIFE AT HOME

HOW TO STUDY AND PHOTOGRAPH IT

BY

R. KEARTON, F.Z.S.

AUTHOR OF "WITH NATURE AND A CAMERA," "BRITISH BIRDS' NESTS,' ETC. ETC.

FULLY ILLUSTRATED BY PHOTOGRAPHS TAKEN DIRECT FROM NATURE BY C. KEARTON

CASSELL AND COMPANY, LIMITED

LONDON, PARIS, NEW YORK & MELBOURNE

1898

ALL RIGHTS RESERVED

LA BELLE SAUVAGE

To

A HOST OF DEAR OLD COMRADES

TOILING WITHIN SOUND

OF

THE BELOVED HUM OF FLEET STREET.

2015243

PREFACE.

SINCE the publication of our last work — "With Nature and a Camera"—my brother and I have received numerous letters from naturalists and photographers throughout the country seeking information and assistance on all sorts of subjects connected with the art of portraying wild creatures in their native haunts. In order to meet this desire for knowledge, we have prepared such a manual as will, we honestly believe, enable every one of average intelligence and perseverance to go out into the fields with a camera and secure pictures equal to anything we have ourselves obtained; and no single item of our experience calculated to help the reader of this book in the attainment of his object has been withheld.

The study of natural history possesses many charms and benefits, chief among which are solace

to the mind and health to the body, and thanks to the insistance upon its delights by many of our great daily and weekly newspapers, a love of the subject, and desire to know more about it, are growing amongst all classes of the community, and it is our earnest desire to help others, if only in ever so small a degree, to read the great book of Nature.

No one can possibly know the fascination of stalking wild creatures in their native haunts with the camera except the man who has himself indulged in the sport. I am aware that I do not approach my subject with the judicial coldness of an unloving eye, but at the same time I speak as a man who knows well the joys of shooting the lordly grouse and circumventing the wily trout, and I unhesitatingly say that this new and bloodless form of sport beats them both in point of downright interest. To pit one's skill and ingenuity against the shyness and cunning of a wild bird, or summon the courage and endurance to descend to its home in the face of some dizzy ocean cliff, is in itself a feat which calls forth the very best hunting instincts of the human race.

Besides being bloodless and consequently harm-

less, this new form of sport also possesses the additional advantage of yielding permanent trophies of the skill and endurance of its votaries, whilst leaving the originals to enjoy their wild free lives, and sit for the next naturalist photographer who comes along to delight in studying them.

This book, which is entirely popular, does not pretend in any measure whatsoever to assume the nature of a guide to collecting and preserving any of the beasts, birds, or insects described in its pages, but is simply designed to help the finding, studying, and photographing of wild things at home going about the everyday business of their lives. It contains a succinct account of our new devices, which are of such value that we have, within the last two or three months, succeeded in photographing the shyest of our feathered friends within a few inches of the camera, and made observations of the most interesting character.

A feature of the book is, that it has been written almost entirely in the fields. Some parts of it have been penned beneath the frowning crags of Shetland, others under the milk-white bloom of a Surrey hedgerow. It has engaged my attention

at all times of the day, but mostly before and after business hours, when summer mists hung low over the land at sunrise and the birds were mad with joy, when the light of a glorious day was dying in the ruddy west, and innumerable insects were droning back and forth through the balmy air; and I can only hope that its readers may taste some of the joy and peace that Nature has ever given to me and is freely offering to all men.

RICHARD KEARTON.

CATERHAM VALLEY,
SURREY.
Nov., 1898.

CONTENTS.

CHAPTER I.

PAGE

APPARATUS AND GENERAL ADVICE 1

CHAPTER II.

PHOTOGRAPHING IN CLIFFS AND TREES, AND FROM BOATS 20

CHAPTER III.

BIRDS 46

CHAPTER IV.

BIRDS (*continued*) 72

CHAPTER V.

MAMMALS 113

CHAPTER VI.

INSECTS AND OTHER SMALL DEER 136

CHAPTER VII.

BITS BY POND, RIVER, AND SEASHORE 162

LIST OF ILLUSTRATIONS.

PAGE

Male Bearded Tit and Young . . . . . *Frontispiece*
Fishing Smack under Sail xvi
Our Camera 3
Artificial Tree Trunk open 12
Artificial Tree Trunk closed. 13
Artificial Rubbish Heap in Cart 15
Home of the Dipper (*Tailpiece*) 19
Preparing to Descend a Cliff 22
The Wrong Way to Descend 24
The Right Way to Descend. 25
Descending an Overhanging Cliff 27
Descending a Sloping-faced Cliff 29
Shag's Nest 33
Shag Stretching Herself 34
Photographing a Shag 35
Ascending a Thick Tree 39
Among the Slender Branches 41
Coot's Nest 43
A Corner of the Farne Islands (*Tailpiece*) 45
Hedge Sparrow on Her Nest 55
Robin Entering Coffee Pot 58
Robin Leaving Coffee Pot 59
Robin's Nest in a Jam Jar 61
Robin Sitting on Her Nest in an Old Biscuit Box 63
Thrush Feeding Young 65
Pied Blackbird Feeding Her Chicks 67
A Highland Cotter's Hut (*Tailpiece*) 71
Skylark, Nest and Young 74
Female Starling 76
Male Starling 77
Longtailed Tit and Nest 78

PAGE

Male Chaffinch at Nest Containing Young 81
Young Red-backed Shrike 84
Swift at Rest on a Rope 85
Robin's Nest in Basket 87
Great Tit Going to Her Nest inside a Disused Pump . . . 88
Wren's Nest in Rope 89
Rooks' Nests 92
House Sparrows Waiting Breakfast 93
Birds' Tracks in Snow (Walking and Hopping) 95
Terns on the Wing 97
Eider Duck on Nest 99
A Group of Puffins 100
Young Gull on Chimney 101
Where Kittiwakes Breed 102
Gulls Feeding—A Scramble for Breakfast 103
Young Gulls Waiting for More Breakfast 104
Gulls on the Wing 105
Gulls Flying Away from Loch Cliff 106
Great Skua Preparing to Swoop 107
Richardson's Skua Soaring 107
Great Skua Attacking Watcher 109
Egg and Young of Great Skua 110
Watcher's Cap Knocked off by Skua 111
Muckle Flugga—The Most Northern Point of the British Islands (*Tailpiece*) 112
Leverets in their Form. 115
Rabbit 118
Water Vole 123
Hedgehog Rolled up 126
Hedgehog 126
Mole 129
Nest of Harvest Mouse 132
Bat 133
The Haunt of the Kingfisher (*Tailpiece*) 135
Small Tortoiseshell Butterfly 137
White Butterfly 139
Meadow Browns 140
Orange Tip Butterfly 141
Grass Moth at "Sugar" 142
Stag Beetles 143
Carabus Intricatus 145
Ermine Moth 146

PAGE

Glow-worm 147
Six Spot Burnet Emerging from Pupa Case 149
Caterpillar 150
Caterpillars' Nest 150
Dragon Fly 151
Bee on Bluebell 152
Wasp's Nest 153
Snails 155
Spider and Web (Photographed by Flashlight) 158
Spider and Web on a Rose Tree 159
Grasshopper 160
A Quiet Corner of Middlesex (*Tailpiece*) 161
Goldfish 163
Frog 164
Tadpoles 165
Toad 167
Lizard 169
Stripping Whale 171
Lobster 174
Sea Anemones 175
Sea Urchin and Starfish 177
Shells on Seashore 179
Barnacles and Purple Shells on Rocks 181
Acorn Barnacles on Mussel 182
Fishing Boats Photographed at Midnight in the Shetlands (*Tailpiece*) 183

FISHING SMACK UNDER SAIL.

WILD LIFE AT HOME

CHAPTER I.

APPARATUS AND GENERAL ADVICE.

THE importance of the points to be dealt with in this chapter can hardly be over-estimated, for upon their intelligent observance and carrying out depends to a very considerable extent the success likely to be ultimately achieved.

I do not propose to go into the chemical or optical side of photography, because it would hardly come within the province of this work, apart from the fact that there are plenty of cheap and trustworthy guides upon the subject.

The question of the price of a camera is one which must be settled to a certain extent by the means of the aspirant; however, let me hasten to add, for the encouragement of all those who are not blessed with an abundance of loose cash, that nowadays an outfit can be bought very cheaply, and that my brother started out upon his photographic career with a guinea camera, with

which he succeeded in making sun pictures sufficiently good and interesting to warrant him in persevering.

The only advice I have to give is that whatever you are going to buy, put your money into a lens of good quality and a camera of strength and stability rather than of elegance, for natural-history photography demands the withstanding of far greater strain and wear and tear than ordinary studio work.

Our camera, of which we give an illustration on the opposite page, is a half-plate one, fitted with a Dallmeyer stigmatic lens and an adjustable miniature on the top, which is used as a sort of view-finder when making studies of flying birds. When fixed in position, and its focus has been set exactly like its working companion beneath it, both are racked out in the same ratio by the screw dominating the larger apparatus, which, when charged with a slide and stopped down according to the requirements of light and speed of exposure, needs no further attention. When the combination is in use the photographer focusses with his right hand, and holding the air-ball or reservoir of his pneumatic tube in his left, squeezes it quickly and firmly, directly he has achieved a sufficiently clear and strong definition of his object, upon the ground-glass of the miniature camera.

It frequently happens, however, when trying to photograph flying birds, such as gannets, that they

are far too quickly in and out of the field of vision commanded by the duplicate to allow its manipulator to make any attempt at focussing. In such cases the only thing possible is to watch the birds fly across the plate of ground glass, and directly one appears fairly well in focus to snap off and thus secure a picture before the object has passed out of view. Although the miniature camera is a very useful accessory it is not absolutely necessary, and I should not recommend the beginner to go to the expense of providing himself with one until he has had a good deal of experience.

OUR CAMERA.

The most useful thing about a natural-history camera is a silent shutter. One of the most acute senses in all wild animals is undoubtedly

that of hearing, and the man who can work with the least noise will, as a rule, get the best results. Our silent shutter is permanently fixed between the lens and the body of the camera. It is one of Thornton and Pickard's, and works very satisfactorily, although I have occasionally known even its slight grating sound when opened make a brooding bird cock her head on one side in the attitude of listening, and, of course, spoil the plate.

Many animals are so full of vitality and movement that they are never still long enough in any attitude for the photographer's brain to communicate with his hand, and his hand with the air-ball controlling the silent shutter, and yet leave a sufficient margin of time in which to expose a plate upon them. For such subjects we use a focal-plane shutter, which is fixed at the back of the camera, and works at from one-twentieth to a thousandth part of a second.

Where the camera needs to be carefully hidden —as in the case of photographing wild rabbits outside their burrows, or water-voles on a river's bank, and worked from a distance with the operator as little exposed as possible—we employ a hundred feet of gutta-percha tubing, about a quarter of an inch in outside diameter, and joined in five or six places by hollow pieces of metal. The value of these is that they enable the photographer to use any length of tubing demanded by circumstances, and it must be borne in mind that

the shorter the tubing the quicker and more certain the exposure.

It is better to carry half a dozen dark slides already charged with plates than to risk re-charging two or three in a changing bag, unless the photographer has a friend who will accompany him upon his expeditions and assist in the somewhat tedious operation. Even then it is necessary to use the greatest care, as a very tiny ray of light will fog a rapid plate and utterly ruin the picture of a lifetime.

When away on our summer holidays, which we generally take in remote parts of the country, we carry our developing materials with us, and prefer papier-maché trays to porcelain ones, as they are much lighter to take about and less likely to suffer damage at the hands of railway porters. A green-baize focussing cloth, slightly larger than the red-and-black ones supplied by dealers in photographic outfits, is a very necessary article for use in natural-history work, especially where the camera has to be hidden and the plate exposed from a distance by the aid of the long pneumatic tube. We have a cloth of this description constantly in use, and have loaded each of its four corners with a charge of shot, so as to prevent them from flapping about in a breeze. A few safety-pins will be found very useful for fastening the cloth over the camera.

Some of the chief things to be remembered when out in the fields are, so far as apparatus is concerned, to have the lens perfectly clean; no

sand or grit in the dark slides, and never to expose them to the light more than is absolutely necessary; to expose plates always in the same order, beginning at number one, and working upwards. This will prevent the aggravating blunder of taking two pictures on the same plate. It is a very useful thing to carry a note-book, and jot down in it the numbers of the plates exposed, and the subjects. An annoying oversight, which even experienced photographers sometimes commit during moments of great excitement caused by some rare opportunity suddenly presenting itself, is to omit to draw out the shutter of their dark slide, and thus expose a bit of polished mahogany instead of a sensitised plate to the subject whose image they wish to perpetuate.

The securing of a good sharp focus is an extremely important thing; and if it is impossible to get a friend to hold the back of his hand exactly where, for example, a bird is expected to come to feed her young in the nest, an old envelope that has been through the post will do just as well.

We are often asked by correspondents what sort of plates we use. We have done a great deal of good work with the Ilford Chromatic, which were until recently known as Isochromatic, for still objects full of colour, such as flowers, birds' eggs, and insects at rest; Imperial Special Rapid for quick-time exposures; and Flashlight for very fast

focal-plane shutter-work and night-photography, when we are either burning magnesium-ribbon or using our small metal flash-lamp as illuminants.

It may be well to mention here one or two of the faults to which the ordinary amateur photographer is prone. He does not spend sufficient time and pains in developing a plate which has had a very rapid exposure, and consequently requires building-up with care and patience, cuts short its stay in the fixing-solution, and hurries it through the washing-tub. It is well to remember that the results obtained from the best camera in the world and the most skilful field-work may be utterly ruined and defeated by carelessness in the developing-room.

The telephoto lens introduced a few years ago is a good apparatus enough for portraying stationary objects with at a distance—as, for instance, a raven's nest in the face of a cliff, when it is possible to get on a level with it. But this lens is not so suitable for most birds, because they are of such a restless disposition that it is impossible to give a sufficiently long exposure. An amusing thing happened to my brother last spring whilst trying to make a study of two or three rooks' nests with a telephoto lens and its attenuated camera. The nests were the beginnings of a new colony in a few elm trees growing alongside a brick-field; and when one of the labourers, who evidently took a good deal of interest in the birds

and their welfare, saw the curious-looking camera being focussed, he thought it was some new kind of machine-gun being sighted, and ran over to my brother and said:

"For God's sake, don't shoot the poor birds, Mister We likes to see 'em a-tryin' to breed 'ere."

Photographing birds on their natural roosts in field-hedges in the winter time, spiders weaving their webs and moths on the feed during summer nights, is an extremely diverting pastime, to say nothing of the valuable pictures to be secured. The only accessories required to indulge in it are a good bull's-eye lantern by the light of which to focus, and a flash-lamp to procure an exposure. We have found a little metal French flash-lamp very convenient. The magnesium powder is put in beneath, and when charged and ready for use, a few drops of methylated spirits are poured into the indented part round the two projecting orifices at the top, and lighted. It is necessary to see that these two orifices are perfectly clear, so as to allow a good strong geyser-like rush of powder through each, and that the spirits when lighted by a match make a flame large enough to fire it. There is nothing so annoying as an ineffectual flash, because in the case of birds it sometimes frightens them away. The powder should be burnt just over the lens, but in no case in front of it, or disappointment will follow. We sometimes use

magnesium-ribbon, but it is not nearly so satisfactory as the flash-lamp, and upon one occasion, at least, a piece fell off on to the bellows of the camera, and burnt a large hole clean through it before we could say "Jack Robinson."

A pair of good field glasses are most essential for watching shy birds and beasts to their haunts, and in selecting them it is desirable to go to makers of repute and choose a pair that are not too heavy, else they may become burdensome during a long day's tramp. If manufacturers of binoculars would reserve a small compartment in their leather cases for a note-book, pencil, and bit of wash-leather or selvyt, they would do field naturalists a real service.

We now come to the consideration of one of the most important features connected with the photography of shy wild animals in their native haunts—viz. the effectual concealment of the camera and its operator. In hiding up it is necessary to be able to see the field covered by the camera, and at the same time avoid being seen by the creature one desires to photograph. Silence and stillness are also absolutely imperative, but their rewards are great and assured.

In the case of timid or cunning birds, of which we desired to make studies on or near their nests, we used to build a bower close by and huddle the camera and its owner inside; but the gradual drooping of leaves, or the unbending of boughs, invariably showed some portion of one or both, and

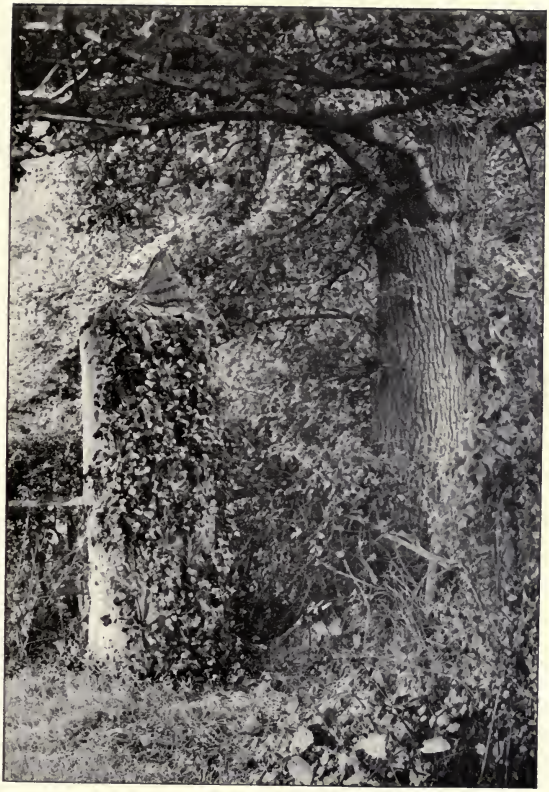
postponed the arrival of the feathered "sitter." I accordingly set myself to work upon the task of thinking out how to make something that would effectually do away with this sort of temporary contrivance, and be at the same time more effective. An imitation tree-trunk of sufficient internal capacity to accommodate my brother and his camera, as shown in the picture on page 12, appeared to be the best appliance for use in woods and by hedgerows, and I determined to build one. Purchasing three pieces of stout bamboo, each seven feet in length, I split them down the centre and lashed them to three small wooden hoops, the topmost and centre ones being twenty-four inches in diameter and the bottom one twenty-seven, so as to represent the base of a tree, and give the legs of our tripod a greater stride. I now found that the green American cloth which I had purchased to cover my skeleton trunk, and when painted to represent its bark, assumed the shape and appearance of a hexagonal column between the hoops. This would not do at all, so I paid a visit to our village ironmonger's shop and bought a sufficient number of yards of galvanised wire of the largest mesh to cover the whole wooden skeleton, and when the covering of cloth was put on over this the effect was much more trunk-like.

Another difficulty now presented itself. We could not carry such a structure along roads and over hedges and ditches for miles without having

it rolled up. So I took the hoops out, and fastening the galvanised wire together I formed it into an oblong sheet, threaded each of the pieces of bamboo through its meshes, like slats, covered the whole with the American cloth, and drawing the two edges together with strings tied the hoops in their respective positions inside. The top was arranged broken-column fashion, to represent a storm-snapped trunk; and in painting that portion of it I took care to make it look as if innumerable birds had perched upon it. My wife painted the whole to represent bark, and when it was dry my brother glued small pieces of moss and lichen on to it, and I fastened a number of pieces of strong thread to the wire inside and passed the ends through to the outside. With these we tied on a number of sprays of ivy, which we stripped from the trunks of trees, as nearly in the same position as that in which they grew, so as to make the whole thing realistic, and the illustration on page 13 will give some idea how far we succeeded. The next thing was to slit a hole for the lens in front, and a small one on either side for the eye of the photographer. The device, it is pleasant to relate, answered our highest expectations upon the very first trial, and some of the photographs taken by its aid, illustrating the next two chapters of this work, furnish incontestable proof of what may be done by such an effective method of hiding.

If any wind happens to be blowing after I have

ARTIFICIAL TREE-TRUNK OPEN.



ARTIFICIAL TREE-TRUNK CLOSED.

placed our artificial tree-trunk over my brother and his camera or tied it round them when in position, I peg it down with little forked twigs cut from any convenient bush, and retire to a distance to await developments. If my brother requires anything he signals for me, either by a whistle or by thrusting the corner of a white handkerchief out behind him, where the bark of his tree-trunk is laced together.

It must not for a moment be supposed that any naturalist or photographer cannot utilise this hiding contrivance when by himself. My brother and I have each used ours with perfect ease when alone.

Slits for the lens or observation may be cut anywhere in the American cloth, because when not in use they close up sufficiently to prevent anything from being seen through them, either from the inside or the outside.

One great merit of this simple and effective contrivance is that it does not cost much to make. The materials which we purchased to make ours from cost us altogether something under twenty shillings.

Of course, such an arrangement as an artificial tree-trunk, however excellent as an imitation, would hardly do to stick up near, say, a larks' nest in the middle of a bare ten-acre field.

In recognition of this fact we began to cast about for some object of familiar aspect to ground-

building birds which we could imitate effectively and cheaply, and which would at the same time be quite light and portable. Our choice fell upon a rubbish-heap such as farmers rake off the land when cleaning it for a grass crop, and use as a

ARTIFICIAL RUBBISH-HEAP.

foundation for ricks. Our artificial tree-trunk had pleased us so much that we at once set to work upon the building of an imitation rubbish-heap. This we constructed out of an old umbrella, to each of the ribs of which I lashed a piece of split bamboo four feet long. The whole was then covered with light-brown holland, and when open

resembled a huge mushroom. By running innumerable bits of string through the material, in such a way as to leave two ends hanging outside, we were enabled to tie small wisps of straw to it all over, and thus virtually thatch the whole structure. We then cut off the handle and shaft of the umbrella close up to the top catch, so that they should not come in the way of the camera when inside, but would still leave sufficient stick behind wherewith to open and shut the whole structure.

Knowing of a lark's nest in a field not far away, we took our new contrivance out early one morning, and, fixing it up ten or a dozen yards away, left it. In the afternoon we moved it close up to the nest, which contained a brood of large young ones, and, putting the camera inside, cut a slit in the holland for the protrusion of the lens, and a small one on each side, commanding the same view as the camera, for purposes of observation. The result which we obtained through its instrumentality is represented on page 74, and, together with the studies of starlings going to feed their young under the thatch of a rick on pages 76 and 77, which we obtained by placing our artificial rubbish-heap in an old farmyard tumbril as shown in our illustration on the previous page, demonstrates in the fullest possible manner its utility.

When in use it is advisable to peg it down, especially if a breeze happens to be blowing, and to see that none of the straws hanging near the

lens has a chance of swinging across the field of vision.

The whole cost of making such a simple and effective hiding arrangement as this is something under a crown; and to anyone who is fond of studying the habits of birds at close quarters, quite apart from photographic considerations, I would strongly recommend the making and using of it, for in the spring it shields the observer from cold winds, and in summer from the hot sun; and watching a bird feed her chicks, and listening to their clamour and her answering notes within two or three feet of it all, are certainly delightful experiences.

A few general hints, especially to those who do not possess the right to wander over property suitable for hunting after natural-history subjects, may not inaptly wind up this chapter.

One of the most important things at the outset is to place yourself on good terms with the farmers upon whose land you would like to search, and, once consent has been gained, carefully refrain from wandering over fields when crops of any kind are likely to be injured thereby. It is, perhaps, unnecessary to add that in no case should hedges be broken down or gates left open. My brother and I have always been very particular upon these points, and have, in consequence, got on excellently with members of the farming community in all parts of the country; and we have

on our part, I am glad to be able to say, on several occasions been in a position to render some small service for this helpful goodwill, by righting "cast" sheep, and even rescuing them from ledges of rock in the face of cliffs down to which they had either slipped by accident, or ventured after a few mouthfuls of luscious-looking grass. On one occasion I remember my brother descending a precipice by the aid of ropes, and bringing a sheep up that was almost too weak to stand; and this he did in spite of the fact that a Highland gamekeeper who stood by declared that he would break his neck if he attempted the feat.

Landowners and gamekeepers are very useful friends, and will generally afford any assistance in their power to any true student of natural history, provided he acts honourably, and does not disturb or otherwise injure the prospects of their game. The following of the last line of conduct cannot be urged too strongly. Do not, for instance, ask for permission to photograph birds' nests on a man's property, and then visit it with the intention of also purloining eggs. Never tempt a keeper to allow you to do anything you would not openly ask his master permission to let you go and do yourself.

When visiting a locality or district where certain specimens are to be found, it is not wise to set up for knowing a lot, as such an attitude invariably freezes the practical man into silence on the spot. Do not dogmatise upon what you have read, even

in the best authorities, or know from personal experience. All living things act differently under different sets of conditions, although some of the latter may be imperceptibly slight.

Finally, remember that, whether out in the field or closeted in the developing-room, pains and patience go largely to the learning of something it is useful to know, and to the making of good pictures.

HOME OF THE DIPPER.

CHAPTER II.

PHOTOGRAPHING IN CLIFFS AND TREES, AND FROM BOATS.

The photographing of many natural-history objects *in situ* necessitates gymnastic work of no mean order, and requires a cool head and strong physical qualities wherewith to accomplish it successfully. Eagles, falcons, ravens, and hooded crows breed in places so difficult of access from a photographic point of view, that it is impossible to reach their nests except by the aid of climbing-ropes. However, under ordinary circumstances cliff descending is much safer than Alpine climbing, and furnishes its dizzying sensations without involving so much travelling expense and fatigue.

We use two Manilla-hemp ropes, each two hundred feet in length, and an inch and a half and two inches in circumference respectively. The thicker or descending rope has three loops at the end for donning round the photographer's hips, and forming a sling, in which he virtually sits when making a descent.

When after a nest in a cliff, the first thing necessary is to find out the precise place at which it is situated, by frightening off its owner. Some

naturalists do this by walking close to the edge and blowing a whistle. We use a revolver, which, though a little heavier to carry about, is much more effective and reliable. In working a cliff two things are requisite. The first is to get as near the edge as the dictates of safety will allow, and at a point commanding a good view of its face to right and left; the second is to take care not to walk out on to any overhanging piece of rock that might by chance give way. I once had a narrow escape from a nasty accident by being a little too venturesome in this respect. It is better, when engaged in preliminary investigations of this kind, to have one end of the thinner or guide rope round the waist, a precaution which begets confidence in the naturalist, and thereby enhances his view of the yawning abyss below him, and also the value of his observations.

It is a grand sight to see a Peregrine falcon shoot out of a fissure in the face of a precipice, and, mounting the air, fly round and round high overhead, the while uttering her loud, defiant *kek-kek-kek*. Some birds, such as shags, will not budge an inch for a shot, even when fired close to them. I have watched members of this species sitting in crevices working their heads about in anger whilst I fired shot after shot into the sea at the bottom of a great amphitheatre formed by the peculiar conformation of the crags, which intensified the din, without leaving their nests and eggs or

PREPARING TO DESCEND A CLIFF.

little black shiny-skinned and quite downless young ones.

Having located the precise position of a nest, the next thing to do is to drive a fairly stout crowbar from eight to twelve inches, according to circumstances, into the ground in a line directly above it. The crowbar should have a slightly backward cant of the head away from the cliff, and have the guide-rope securely tied to that portion of it close to the ground in whole or in part, according to the requirements of the place to be descended. It would be quite useless to fling two hundred feet of guide-rope over a cliff only a hundred feet in depth, not to say harmful, in a place with the sea at the bottom. In the case of a crag having a certain amount of backward summit slope, the rope should be thrown well out in coil, so as to get it clear of obstacles, and thus minimise the work and trouble of the descender.

It is an extremely important thing to have a couple of fairly strong, level-headed men to pay out and haul in the descending rope. It is of no use taking men who would be likely to interpret the first weird cry of a sea-bird as coming from the photographer in distress a hundred feet below, and have their hearts frightened into their boots accordingly. On the other hand, it is equally dangerous to have men assisting who underestimate the gravity of the situation, and consequently grow careless.

THE WRONG WAY TO DESCEND.

Assuming that the right sort of men are assisting, and that the tackle may be depended upon, the photographer dons the loops at the end of the descending ropes, and prepares to walk backwards over the edge of the cliff, as shown in the illustration on p. 22. The two gentlemen figuring in the picture as rope-manipulators are both closely identified with British ornithology—the one nearest my brother being the son of Dr. Saxby, of Shetland-bird fame, and the other Mr. Laurence Edmondston, the Laird of Unst, and pro-

tector of the great skuas still breeding on Herma Ness.

Many—in fact, I might say nearly all—cliff-climbers, when making their first descent, instead of stepping boldly over and trusting to their ropes, instinctively clutch and cling to the face of the crag, as shown in our illustration on p. 24, and invariably lose a liberal amount of skin from their knees and elbows upon sharp projections of rock as they go. Of course, to the man who is looking on, especially from the bottom, it looks a comparatively easy matter, but it is

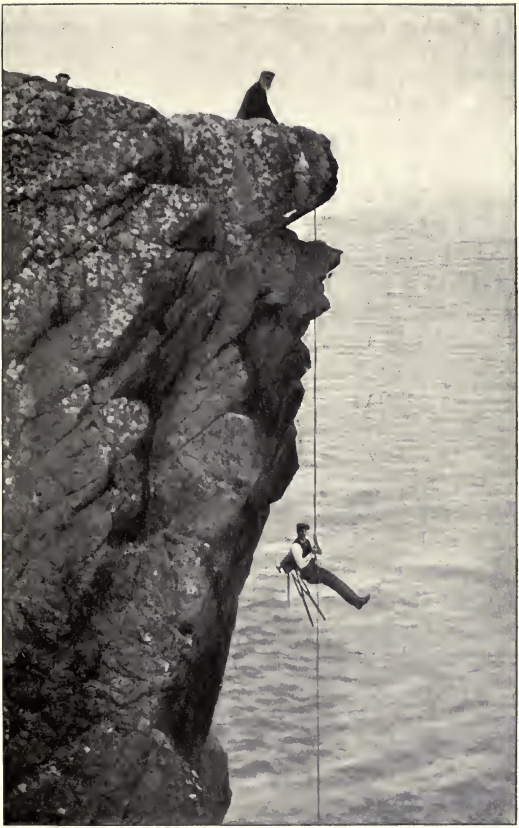
THE RIGHT WAY TO DESCEND.

not quite so simple as it looks. The reasoning powers of the climber tell him that he is as safe as the Bank of England, but his original instincts of self-preservation are in this instance stronger, and make him believe that he is not.

Our illustration on page 25 shows how to step boldly out over the edge of a cliff, trusting implicitly to the ropes and the men who are attending to them. Even then an overhanging crag requires very careful treatment until the climber swings clear of it and becomes quite insulated, as shown in the picture opposite, because in walking down its face his feet, especially if he makes a descent in his boots, are likely to slip out, in which case his body would of necessity strike heavily against the rock.

A very good bit of preliminary training for the would-be cragsman in the use of climbing-ropes is to get a friend to lower him over a high garden wall or down some miniature cliff. It will give him a capital insight into the business, and beget a deal of confidence. I went down a rough overhanging crag seventy feet deep the very first time I donned the climbing-ropes, but it required al the nerve and resolution I could summon; and I would strongly recommend the novice to try a cliff of modest dimensions for a start, unless he be gifted with a head as cool as ice and nerves of iron.

One very important precaution—in fact, so far as the descender's safety depends upon his own

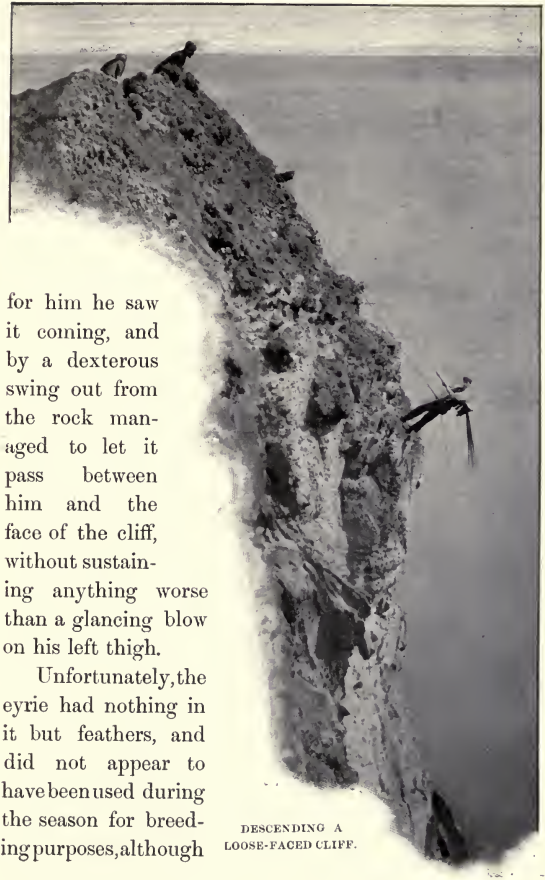


DESCENDING AN OVERHANGING CLIFF.

actions, the most important—is to clear away all the loose stones and rubble between the crowbar and solid rock-edge of such a precipice as that which the picture on p. 29 represents my brother in the act of going down. If this very imperative piece of work be neglected, the lowering rope is sure to pull them out when he is being drawn up again; and woe betide the hardest head or best-built camera struck by even a moderate-sized stone with a velocity upon it gained by a perpendicular drop of fifty or sixty feet.

Whilst in the Shetlands last spring we had a narrow escape from an accident of this kind. We induced a young fellow to take us to a place where he knew of a white-tailed or sea-eagle's eyrie on a ledge in the face of a cliff some two hundred and fifty feet in height. When we reached the place our hearts bounded again with excitement, for the great bird flung herself lazily off the ledge into space within gunshot of us, and majestically flapped her way seawards with the bright morning sunlight glinting on her back and a small unheeded crowd of noisy gulls mobbing her.

The prospect of adding a photograph of her eyrie and eggs or young to our collection so excited my brother that in descending he did not exercise the necessary care in clearing away every stone in his path, with the result that in returning he had the horror of seeing the rope drag a good-sized one from its bed beneath a tuft of grass. Luckily



DESCENDING A LOOSE-FACED CLIFF.

for him he saw it coming, and by a dexterous swing out from the rock managed to let it pass between him and the face of the cliff, without sustaining anything worse than a glancing blow on his left thigh.

Unfortunately, the eyrie had nothing in it but feathers, and did not appear to have been used during the season for breeding purposes, although

we put the bird off it once, and saw her return to it in the afternoon of the same day.

Another indispensable precaution in descending a cliff with ropes is to see that the one sustaining the weight of the cragsman's body does not run over such sharp projecting rocks as will be likely to damage it by chafing, or in narrow crevices that will hinder it from running freely up and down.

In no case is it wise when making a descent to diverge far from a supposed perpendicular line drawn from the crowbar to the bottom of the crag in order to take advantage of anything like an easier path or to get to a nest to right or left, because such a course is fraught with danger. It is far better to be drawn up, and make a fresh descent, than to risk snapping one's ropes and being precipitated two or three hundred feet into the sea below.

Cliff-climbing is very exhilarating work, and when once the climber becomes used to it, and has confidence in his ropes and assistants, it assumes something very like a fascination over its votaries, who keep on thirsting after a higher crag every time they go forth. The St. Kildans positively love their rocks, and told me that they could not live without the exercise they get in climbing upon them.

Some people talk of their inability to look over a high cliff because of a queer instinctive desire to throw themselves into the yawning chasm below.

I know nothing myself of this strange sensation, therefore cannot properly appreciate it, and I am quite sure that my brother is worse off in a supply of weak nerves of this kind than I am. A friend of ours said to me one day, whilst on our way to make a descent over which he considered we were rather light-hearted. "You fellows have to do the work and run the risk, and I've only to sit and look on; but I wish I could view the business with as much equanimity as you appear to do." Probably we do view this kind of work with a certain amount of equanimity, but we never under-estimate its dangers or allow familiarity to breed contempt. We thoroughly recognise that it would be useless to take care after an accident, so we use plenty of it, good reliable tackle and the most capable assistants we can procure, and have in consequence a great deal of confidence.

In paying out the rope to the descender it is necessary to do so from behind the crowbar, and not to allow it to slip away in jerks, as such a procedure makes it exceedingly unpleasant for the man who is dangling in mid-air fifty or sixty feet below, and might possibly snap an indifferent piece of hemp.

Where assistance is easily procurable we get a man to signal from some convenient point my brother's requirements by a preconcerted code of arm-movements, somewhat after the manner of railway-carriage shunters; but where it is not, and

this is in the generality of places, we manage by calls. For more rope the cry is a long-drawn "slaak," and for enough a short, sharp "stop." These signals are, however, very difficult to catch and distinguish at times when on big sea-cliffs, on account of the boom of the waves below and the crying and wailing of the seafowl. No talking ought to be indulged in by the people round the crowbar, as it interferes with the hearing and proper understanding of the photographer's wants.

In the case of a ledge, sufficiently large to walk along and fix the camera up on being encountered, it is never wise to let go the ropes, however inconvenient they may become, especially if the ledge has been gained by a swing in. An acquaintance of ours, upon descending to a white tailed eagle's eyrie situated on a ledge in the face of an ocean cliff, did this, and in consequence had a rather perilous time of it. When he desired to retrace his steps he found that he could not reach his ropes, and dared not risk a leap out and the chance of missing them. His only alternative was a difficult zigzagging climb along the face of the crag, which, after a deal of hesitation, he essayed and succeeded in safely accomplishing.

The best way to take a camera and tripod down a cliff is to sling them over the back of the photographer, as shown in our illustrations, for then they do not impede his progress or inconvenience him in any way. Having got down to an eyrie,

the next thing is to slip two of the legs of the tripod through a belt fastened round the waist, one on the right and the other on the left, and the third into any convenient crevice or fissure in the rock. The focussing must be done with the camera practically resting on the chest, and the body of the photographer in a position almost at right angles to the line of the precipice. It is somewhat difficult work. However, the example on this page, representing a shag's nest and eggs some fifty or sixty feet down a sea-cliff, shows what may be

SHAG'S NEST.

accomplished by the gymnastic camera-man. Of course it would be a much easier and far simpler matter to take a hand-camera down and make studies with it. We have never used one, however, for the purpose, on account of the difficulty of using a lens of fixed focus at close quarters and inability to measure the distance.

SHAG STRETCHING HERSELF

Windy weather is quite unsuitable for rope work or cliff work of any kind, and is extremely aggravating to the naturalist with a limited amount of time on hand. However, it is better to lie by and wait with as much patience as possible than to risk an accident through mere foolhardiness.

Of course, many excellent pictures and much useful information may be obtained amongst rocks without the assistance of climbing-ropes.

We have succeeded in getting at and photographing the eyries and eggs of the golden eagle and the common buzzard without as much as a bit of string, and have also visited the wind-swept

PHOTOGRAPHING A SHAG.

egg-ledges of the fulmar petrel in St. Kilda without any help whatever. But here, again, it is a matter of a cool head and a sure foot, and in the absence of either or both it would be madness to make the attempt.

The picture on the preceding page shows my brother at work on a shelf in a Shetland cliff, whither we climbed by taking advantage of ledges. He is just in the act of making a study of a shag which had left her nest in a sheltered corner upon his approach, and walked to the edge of the ledge ready to fling herself into space and fly away out to sea upon the slightest alarm.

A Yorkshire naturalist friend of ours, who accompanied us that day, was so highly amused at seeing my brother creep carefully along the guano-streaming shelf of rock, with his camera in front of him and his head well hidden beneath the focussing-cloth, all the while trying to arrest the bird's attention by imitating its own peculiar form of language, that he suggested photographing the photographer at work, and as we had a spare camera he tried his hand, with the result already mentioned. Some idea may be gathered of how near a bird it is possible to get by careful stalking when it is mentioned that the picture of the shag in the act of stretching herself was made a moment after the one of the photographer, and has in no way been enlarged. One of its chief beauties is that it represents exactly the exercise indulged in

by a cramped bird just after leaving a nest full of hard-sat eggs.

The secret of getting close to birds in such situations without alarming them is to approach very, very slowly, with the head quite hidden under the focussing-cloth, and to be careful not to make a slip or stumble, an occurrence which may end disastrously in more than one sense of the term. Of course, when I say the photographer must keep his head quite hidden under his focussing-cloth, I do not mean to convey that he must not leave sufficient space to peep past the side or top of his camera in order to make observations of the behaviour of the creature he is stalking, else he would not be able to see when it became nervously uneasy and was preparing to depart. When a bird, for instance, begins to work its neck up and down, and shuffle its feet as it stands on the edge of a rock, it is thinking about taking flight, and the photographer should remain quite still until it has become reassured.

I mentioned just now the fact of my brother engaging the attention and reassuring a shag by mimicking its notes. Half an hour afterwards the cries of a bird of the same species sounded so like those of a human being in distress, that they gave me one of the worst frights I ever endured.

The rock we were on formed a sort of abrupt promontory, and had a ledge corresponding to the one from which the shag was photographed on the

opposite side, but running right round to the front of the bold mass. This ledge had a sharp slope downwards, and was rendered additionally dangerous in one place by part of the crag above it jutting out in such a way as to make the path very narrow. Upon walking along it and round to the front I discovered a number of common guillemots sitting on a ledge, and at once went back to apprise the photographer, who was recharging his dark slides with plates. He at once started round with his camera, and I began to examine some nests in a crevice which ran almost through the promontory. All at once I heard such cries of distress as perfectly terrified me. I was sure that my brother had slipped off the ledge and lay badly mangled on the rough rocks below, and rushed round in a great state of alarm to find him standing with a shag, which he had caught on her nest, in his hand. Upon my approach the affrighted creature snapped at my left hand like a dog, and cut the back of it with her sharp-edged upper mandible so deeply that the blood trickled off my finger-tips, yet I was too much relieved to feel angry with her.

In climbing about rocks without ropes great care should always be taken where water oozes out and runs across a ledge, because it is sure to make it slippery. On no account is it wise to attempt to show off one's agility on cliffs. I knew a young fellow who did this, with the result that when he

ASCENDING A THICK TREE.

came to a ledge that was moist and slimy he fell over and was drowned. What was still more sad, he caused the death of two other men who bravely attempted to rescue him.

We next come to the consideration of studying and photographing birds' nests, squirrels' dreys, and similar objects in trees and high hedges. It is not so arduous a business as cliff-work, nor so dangerous, yet it requires a fair amount of physical strength, level-headedness, and care, to carry out successfully.

In the case of trees that are too thick in the trunk to be clasped and swarmed in the ordinary way my brother puts on a pair of climbing-irons, and ascends with his camera slung upon his back, as shown on the previous page. He is, however, not very partial to these aids, and dispenses with them whenever he can, and I remember an amusing accident which once befell us in consequence.

A gentleman living near us expressed a great desire to go out and watch us photograph the nest and eggs of a carrion crow. Our photographer tried several times in vain to swarm the giant trunk of a tree in which a member of the species had built, and then conceived the notion of getting amongst its branches by throwing the end of a rope over the lowest one, and putting one foot into a loop, allowing our spectator and myself to haul him up. We borrowed a good strong rope from an adjoining farmhouse, made a big loop at

one end of it, flung it over a branch, and then began to hoist the photographer, minus his camera. The work was so difficult, and our progress so poor, that my brother determined to help us in truly Hibernian style. He seized our portion of the rope, and giving it a vigorous tug, after we had actually succeeded in raising him six or seven feet off the ground, turned himself completely upside down. His foot slipped out of the loop, and he came down squarely on his back, and knocked every breath of wind out of his body; I went down like a ninepin on the top of our friend, and drove him and a spick-and-span tweed suit deep into a sea of mud and dirt produced by innumerable bullocks' hoofs trampling to and fro through a gateway close by.

"AMONG THE SLENDER BRANCHES."

In examining the nests of such birds as build amongst the slender topmost branches of tall trees, whither it would be dangerous to attempt to climb,

a bit of looking-glass fixed to a long stick or fishing-rod, and easily moved to any angle, will reveal their contents. Professional naturalists supply rods and glasses already fitted, but we generally use a lady's small dressing-mirror with a folding handle, by which we lash it to a long stick cut from a hedge.

It is often better, when about to make a photographic study of some object situated in a high tree plentifully supplied with branches, to ascend without the camera and haul it up afterwards by means of a rope.

In many cases the legs of the tripod may be lashed to convenient branches close to the nest to be photographed, but in some this is impossible on account of their extreme slenderness. In cases of this kind we hoist a ladder up and lash it in a position as nearly perpendicular as possible, in order to reduce the leverage produced by the photographer's weight to a minimum, and, ascending above it, fix the camera as seen in the illustration on page 41. Of course this is going to a lot of trouble, but if it is desired to make a picture of, say, a carrion crow's nest and eggs *in situ*, it is necessary to get well above them, as the structure is very deep, the bird wisely recognising that it must be so in order to prevent her treasures from falling out when the whole tree is being violently swayed to and fro by a spring gale.

Nests situated in high hedges are often very

troublesome to photograph on account of their elevation. A way out of the difficulty is to cut three stout sticks of the required length, and,

COOT'S NEST.

lashing one to each leg of the tripod, virtually place the apparatus on stilts. The focussing, insertion of dark slides, and exposure of plates, may be managed from a companion's shoulders. When near a farm-yard a tumbril may often be borrowed from which

to take photographs in tall hedges. We have made many pictures in both ways, and though the trouble has been sometimes considerable, the results have more than repaid us.

Photographing from boats, either moored or in motion, is a somewhat difficult matter; however, it can be managed, and with a fair degree of success too, if a little care and patience be exercised. We have succeeded in photographing a Reed-warbler's nest from a rowing-boat held in position by an oar only on the River Cam, and a dabchick's nest on a small lough in the South of Ireland—by lashing a long pole to each leg of the tripod, and lowering the whole carefully over the side of a boat.

The study of the coot's nest on the previous page was made amongst the reeds of a Norfolk Broad by seizing a number of them on each side of the boat, and thus holding it in position. Even then the exposure had of necessity to be a short one, on account of the liability of such an unstable article as a boat in water to answer at once the slightest movement of any of its occupants.

We sometimes use our miniature camera or view-finder with good effect whilst on the water. The vignette of a fishing-smack under sail at the back of the half-title to this book was taken by its aid from a rowing-boat being pulled right across her bows.

The miniature camera is, of course, an absolute necessity in making pictures of sea-birds at home

on ledges of crags dropping sheer into the ocean, for however calm the water may be, it is impossible to focus and get a plate in and exposed before the tide has altered the position of the vessel. We have succeeded in making some very good pictures from steam-launches and sailing and rowing boats, but of necessity the conditions require fast plates, a good light, and a rapid exposure.

A CORNER OF THE FARNE ISLANDS.

CHAPTER III.

BIRDS.

The best time for studying and photographing wild birds in their native haunts is undoubtedly the spring. They are then tamest and most numerous, and their nests, eggs, and young furnish endless pleasure in finding, observing, and photographing.

April, May, and June are the months during which by far the greatest number of birds lay their eggs and bring forth their young; but many commence before the first-named month, and a large number continue to breed after the last. Of course it means the spending of a good deal of time in the fields, woods, moors, and marshes; but this is an essential part of a field-naturalist's training, and in its exercise lies one of the chief charms of natural history. Many young fellows, engaged in business in London and other large towns, urge that they do not get the leisure time necessary to enable them to do much outdoor work. For the encouragement of all such, let me mention that my brother and I enjoy but a few days' holiday over the "chronic fortnight" every year, and are in consequence out during suitable weather in the

springtime, morning after morning, by 4.30 a.m. Men who do not rise early miss much, for the sweetness of many days is all unfolded in the early morning, when the dewdrops are glistening on the grass, and the bloom-laden hedgerows are giving forth their scents; while blackbirds, thrushes, larks, chaffinches, and numerous other songsters vie with each other in giving voice to the joy within them. These are things we enjoy over and over again and remember with pleasure, and yet by nine o'clock we are in the centre and bustle of London town.

In searching for nests of birds that build in hedgerows and bushes, it is a good plan to select the shady and, if possible, the lower side, as the light coming through the branches and foliage will greatly facilitate the discovery of any nest situated therein. In examining furze, juniper, bramble, heather, and low bushes, it is well to go cautiously to work, and tap them on either hand with a walking-stick. The rustle of a bird's wings will not often escape the ears of the searcher, even if their owner manages to elude his eyes. On hearing or seeing a bird leave a bush, the search for its nest needs to be conducted with a great deal of care, for many ornithological treasures are ruined by young naturalists and beginners in their eager haste to find and examine them.

The best way to discover the nests and eggs of all, or nearly all, the members of the family of

waders is to lie down and watch through a pair of good field-glasses such birds as indicate by their behaviour the presence of a nest. Provided the observer keeps quite still, and does not make any noise calculated to create alarm, half an hour's waiting will generally result in the finding of what is wanted. Another important point about this kind of field-work is when a bird has been watched on to her nest—say a quarter of a mile away—to make careful mental notes of as many landmarks as possible in a direct line between the place where the student is situated and the precise spot whereon the nest is located. This very necessary precaution is often overlooked in the excitement of the moment—the bird rises directly she sees the observer stir, and before he has covered half the intervening distance the aspect of the ground is changed, and he has hopelessly lost the place.

When a bird will not come near its nest, or the place where it is suspected to be, it will often betray the whereabouts of its treasure by rushing up to drive some winged intruder that has accidentally wandered too near away, and a patient wait is sure to be rewarded. I found a whimbrel's nest in the Shetlands last summer in this way. She would not go to it for a considerable while, and just as I began to doubt whether she really had one at all, a Richardson's skua flew nearer to it than she cared to see him venture, and a vicious

swoop convinced me that a further wait would be rewarded. And it certainly was, for I had the pleasure of seeing my first whimbrel's nest, containing four beautifully marked eggs, which my brother photographed *in situ*. Let me add, for the satisfaction of all bird-lovers, that we left the nest and eggs undisturbed to help to swell the ranks of this much-harassed and none too numerous species.

The secret of success in finding birds' nests lies in cultivating and quickening the powers of observation. As an instance of what may be accomplished by training this faculty, I may mention an incident in my own career. My brother and I had specially journeyed down to Norfolk to photograph the nest and eggs of a bearded tit, or reed pheasant; but, alas! when we got there some ruthless hand had removed the last one of which the marshmen had any knowledge, and they were extremely doubtful whether we should be able to find another, as it was late in the season. However, nothing daunted, we tried hard and long, and failed; but when we were on our way home something unexpected happened. One of the two old marshmen who accompanied us suddenly remembered that he wanted to show us a wild duck's nest containing twelve eggs. We were tired and gloomy over our ill-luck, and didn't care a fig about seeing the duck's nest, as we had examined many scores belonging to the species

before; but it was not in us to be heartless enough to trample upon an old man's enthusiasm and hurt his feelings by refusing to go and see an object which he thought would interest us; so away we all coasted in our two little boats through the reeds.

When we arrived at the small circular island on which it was situated, I allowed my guide to approach the wild duck's nest alone, as he was not quite certain of its exact locality, whilst I stood at a point of vantage and kept my eyes open. Directly he got close up to her, the bird rose with a great clatter, and took her departure. She had not flown more than three yards before I observed a male bearded tit rise from beneath her, and make off to some tall reeds thirty or forty yards away, where he was immediately joined by his mate. We searched the place where he rose carefully, but in vain; and our native companions were both quite sure there couldn't be a nest. The fact of the tit getting up in the way it did, and being joined immediately by its mate, aroused my suspicions; but its sex puzzled me and weakened my faith in its having come from a nest to some extent. However, we each took up points of vantage round about the place, and began to wait and watch. By-and-by a sedge-warbler flew in, and alighting near the wild duck's nest, began to hop about leisurely amongst the broken-down reeds and tangled masses of coarse brown dead grass. It was

followed in a little while by a pair of bearded tits, but they did not stay long.

My companions began to grow weary of waiting, and so did the duck of our presence near her nest, for she commenced to beat the water with her wings in a little open channel close by in the hope of attracting our attention and drawing us off; but the tits were hanging about closer than ever to the place where I suspected they had a nest, and I persuaded the old marshmen to stay a little longer. One of them crept up and covered the duck's eggs with his handkerchief, and then we remained absolutely still for a while. My nearest neighbour thought he had seen one of the tits go to the nest; but he had his eye on the sedge-warbler, which had gone deep down in search of some insect, as I could easily make out by the aid of my field-glasses. Shortly after this the male reed pheasant disappeared, and the female flew away. I indicated to my companions the exact place where I had seen him last, and we all closed in stealthily from different points of the compass. When we got close up he flew off a beautiful and particularly well-hidden nest, containing six eggs.

Birds'-nesting is very much like fishing, as one of its greatest charms lies in the glorious uncertainty of one's luck.

In wading amongst reeds, rushes, and other aquatic vegetation on the banks of rivers, tarns, and ponds, it is necessary to exercise a good deal

of care, especially if alone; for once, whilst searching for nests on the shores of a northern tarn, I had a narrow escape from disappearing beneath the treacherous surface of a deep moss-bog, into which I foolishly ventured too far.

The nests of ground-builders, such as larks pipits, and buntings, I have always found most easily by walking across their haunts in the evening; however, they are, as a rule, dropped upon in sufficient numbers by accident whilst roaming about any country-side where they breed.

Those of grouse, partridges, pheasants, and many other birds of special interest and importance to game preservers and sportsmen, should be studied under the superintendence of some sympathetic gamekeeper, who will, for a small consideration, also help with other birds, such as hawks, crows, jays, ravens, buzzards and falcons.

The males of some species, such as whinchats, wheatears, stonechats, robins, and shrikes, betray the nesting-places of their mates either by hanging about in the immediate vicinity, and making an undue amount of demonstration upon the approach of anything they may consider in the light of an enemy, or by feeding the sitting birds whilst under observation. Nests containing young birds may generally be found by sitting down and quietly watching through a pair of field-glasses their parents go to feed them.

The courtship of birds is an extremely inter-

esting phase of their lives, and correspondingly difficult to study, apart from mere brute-fighting for the fair. Whilst my brother waits inside one of our hiding contrivances for some bird to return to her nest and be photographed, I often wander round, or sit at a respectable distance, field-glasses in hand and as still as a statue. One morning last spring I watched a pair of red-backed shrikes, or butcher-birds, sweethearting, and the antics of the male were both amusing and interesting. He flew up into a tolerably high oak and began to shake his wings, which he allowed to droop loosely by his sides as if he were stricken with palsy. The female followed and, perching close beside her lord and master, listened attentively to some poor attempts at a warbling kind of song, which was accompanied by an awkward sort of dance. When this entertainment had lasted for half a minute or so, the gay Lothario flung himself headlong from his perch and sailed through the air with outstretched wings to another coign of vantage, evidently for the express purpose of showing off the richly-coloured plumage of his upper parts. He then began to quiver his drooping wings all over again, and if his companion did not immediately join him he returned to fetch her. Once or twice he flew down to the ground, and picking up a dainty morsel of food flew back and gave it to his sweetheart in the most gallant manner. During their love-making they wandered along a hedgerow close past me, as

I stood perfectly still, with my back against a big tree. They had not got far past when they accidentally stumbled upon a blackbird's nest containing young ones, and were promptly mobbed by its owners, who "spink, spink, spinked" just as loudly and angrily as if a cat had intruded itself upon them and their offspring.

It is a very pretty sight to see a bird building its nest. I have watched coots dive to the bottom of a pond for aquatic weeds, and, swimming up with a heavy burden, place it upon the raft-like collection already gathered—have thrown feathers into the air by handfuls, and watched swallows and martins dexterously catch and carry them off to line their nests with, and the great clumsy solan goose constructing her rude cradle of dead seaweed; but I never saw anything so interesting as a hedge-sparrow making her little home of slender twigs, moss, and hair. I watched one last spring for over an hour very early one sunny Sunday morning, She brought wee twigs and dead grass stems at a great rate, and when she had laid them in position upon the edge of her nest from the outside. hopped inside, and gave the structure shape and symmetry by hustling round and round, pressing the materials into position with her breast, and picking little twigs out here and there, and replacing them in more suitable spots.

A hedge-sparrow has a peculiar way of entering, her nest. If under observation, of which she is

HEDGE-SPARROW ON HER NEST.

conscious, she will hop uneasily about the bush or hedge wherein it is situated and, of a sudden, rush right on to it. We tested the value of our artificial tree-trunk as an effective hiding-place upon a member of this species last spring. We first of all stuck the camera up in front of the nest, and covering it with a grass-green focussing-cloth, waited at a distance ready to release the shutter by means of the pneumatic tube; but in vain, she would not come near. Then we fixed up our newly-constructed tree-trunk, with the photographer and his camera inside, and, to our great satisfaction, she returned in less than two minutes. Curiously enough, whilst all was perfectly still and silent, she kept on moving her head about, but directly my brother made a low, intentional cough, she kept her little head perfectly still and listened, and he exposed his plate.

I have recently seen it stated that the birds of London and its suburbs have decreased because of the cats and increased population. Whilst recognising the folly of hating a dumb animal merely because it carries into operation an inherited liking for one particular kind of food, I must frankly confess that I do not love cats, and it will be well to bear this avowal in mind whilst reading the following account of my experiences. This year I have known of the following species of birds having nests and eggs within five hundred yards of a Greater London farmhouse, boasting an army of

no less than five adult cats:—Pheasant, partridge, carrion-crow, missel-thrush, song-thrush, blackbird, starling, house-sparrow, hedge-sparrow, robin, wren, barn-swallow, house-martin, chaffinch, lark, whinchat, red-backed shrike, yellow-hammer, moorhen, lapwing, great tit, blue tit, kestrel, turtle-dove, white-throat.

During January and February I placed old coffee-pots, jam-jars, kettles, biscuit-boxes, and other things suitable for robins to breed in, round the rick-yard and garden of this farmhouse, and early in April I was gratified to find that one of several pairs of robins living in the vicinity had taken possession of a coffee-pot which I had laid on its side in a hedgerow running parallel with a cart-shed. In this she reared two broods during the season, and we made a good many photographs of her, two of which appear overleaf. Another pair of birds took possession of the lower half of a large stone beer-bottle, lying on its side upon the ground in the garden hedgerow, and a third in the jam-jar, as represented in our photograph on page 61. This jar was situated nearest the house, and about midway between the two other nests. One morning, about six o'clock, whilst looking round I started a rabbit from a ditch close by the jam-jar, and a cat, which appeared to have been stalking it, also jumped out and bounded off home. I began to have fears for the safety of my robins, and when the one in the jar had three or four

ROBIN ENTERING COFFEE-POT.

eggs in I got my brother to make a study of it. A day or two afterwards my fears proved to have been well grounded, for I found the nest dragged more than half-way out and all the eggs but one lying broken at the bottom of the ditch. The remaining egg had a long jagged rent in it, which I judged to have been made by a cat's claw, but it is never safe to jump to conclusions. I reasoned with myself that no cat could have got at the nest without either making a spring across the ditch or from the bottom of it, and, if so, there ought to be evidence of the fact in the shape of hairs on the sticks and bushes immediately in front of the jam-jar. Examination

revealed their presence, and their number and colour convinced me that they had been torn out of the feline depredator's underparts as he crashed down amongst the twigs. Luckily, I could find not a single feather, which circumstance argued well for the robin's safety.

The farmer's wife set quite as great store by her cats as I did by the birds, and as I could in no way justify drastic measures in protecting the latter, I set myself the task of discovering how I could best accomplish this most desirable end. Fortunately, I remembered once seeing an inquisitive pussy take a sniff at an uncorked bottle containing a quantity of liquid ammonia, and jump sky-high

ROBIN LEAVING COFFEE-POT.

in consequence. My brother immediately bought a supply of the very strongest purchasable, and placing a quantity of it in several small bottles without corks, we buried them right up to their necks near the remaining robins' nests, a hedge-sparrow's, and a blackbird's, which were all within fifty yards of each other, and all of which escaped. I should much have liked to see the cat that came in for a sniff of that ammonia, and have known its candid opinion of the sensations caused thereby. I got one myself by accident whilst trying to imitate a cat creeping along the dry ditch bottom, and it very nearly knocked me over on my back.

The pair of robins that had been driven from the jam-pot soon built another nest twenty-five yards further along the same ditch, and only two feet away from the blackbird's nest mentioned above. Here they succeeded in bringing off a brood of five chicks in safety. I then tore the lid off an old biscuit-box, which I found on a rubbish heap in a field hard by, and placed it on its side within a few feet of the disused nest. It was difficult to keep in position on account of its lightness and the springiness of the slender branches upon which it was resting, so I planted an old boot on the top by way of ballast. In about a month's time a pair of redbreasts discovered it and made a nest in it, and we photographed the hen sitting on her eggs, as shown in our illustration on page 63.

Immediately in front of the farmhouse is a paddock containing two old fruit-trees, one of which is hollow and has a crack in the side running down to within twenty inches of the ground.

ROBIN'S NEST IN A JAM-JAR.

In the spring of 1896 a pair of starlings bred in it, and their nest was situated so far down the hole that I was obliged to use a lighted wax vesta on the end of a cleft stick in order to make out its contents. In 1897 the hole was tenanted by house-sparrows, and the materials of their nest

filled it up so much that the eggs could be easily identified without the aid of artificial light. This year a pair of great tits took possession, and their nest was so elevated that the sitting bird could easily be seen. This circumstance yielded some interesting information in regard to her habits, but I regret to say it ultimately proved fatal to her.

When anyone looked into the hole the brooding tit puffed herself out to twice her natural size, and went off in the most extraordinary hissing explosions, the force of each of which spread her tail out against the rotten inner walls of the hollow tree like a little fan. She appeared to inflate herself with air, and then suddenly eject it and collapse. After five or six explosions she became exhausted, and each succeeding effort to terrify away the inquisitive intruder grew more feeble.

One evening, when the young had been hatched out and their parents were busily engaged in feeding them, we fixed up our artificial rubbish-heap close beside the tree with the intention of photographing them as they entered and left the hole, but the lack of a sufficiently strong light and the very rapid movements of the birds prevented us from making any studies on that occasion. We ascertained, however, that the male was much bolder than the female in approaching the nest, and that whenever the latter got tired of waiting about with her live caterpillars, she swallowed them and flew off in search of a fresh supply.

We did not visit the place during the next day, which was Sunday, but ascertained from a cowman, who took an intelligent interest in natural history, that they were all right when he called his cattle home to milk in the evening. At six

ROBIN SITTING ON HER NEST IN AN OLD BISCUIT-BOX.

o'clock next morning we were maddened to find the female and all her young ones dead in the nest. A close examination revealed the presence of a cat's short hairs upon the bark at the bottom of the slit in the tree, and the fact that the devoted mother-tit had all the feathers scratched off her back. By the aid of a hooked stick I got her and her nest and young ones, which were all dead, out, and found the bare skin on the poor creature's

back had been lacerated in several places by the cat's claws. How she escaped being dragged out I cannot imagine, except upon the hypothesis that she was all but out of reach of the marauding brute as he stood on tiptoe against the tree. Her mate was calling pathetically for her from the trees around, and continued to do so all day long.

One day I discovered a song-thrush sitting on her nest in the cart-shed, and upon putting her off, ascertained that she had five fine large young ones. I immediately retired to watch her, through my field-glasses, feeding them. It was not long before she returned with a supply of worms, which she distributed with commendable impartiality amongst her hungry offspring. Instead, however, of going off in search of more, she sat down and covered her chicks with a look of supreme maternal contentment. By-and-by along came her mate with a quantity of food, and she rose and stood on the edge of the nest and watched him administer it with her head cocked on one side. I was extremely anxious to get a study representing this last scene, so we fixed up the camera on a hay-elevator, which commanded a view of the nest, and hid it with straw and its operator also in the body of an old cart close by. He actually succeeded in making a picture of the two parent-birds at the nest, as described above; but unfortunately his view and that of the camera were from somewhat different points, and instead of the photograph showing what we wanted, it

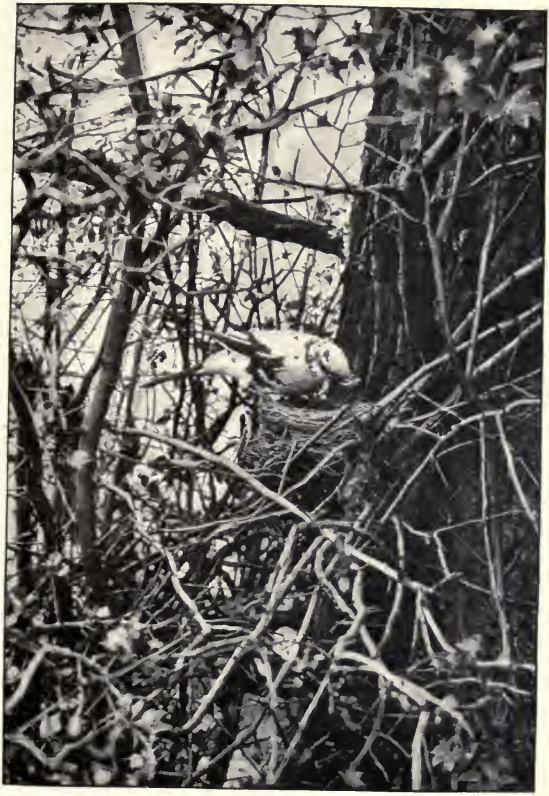
THRUSH FEEDING YOUNG.

revealed only the back of the male and part of the breast of the female. We afterwards made several studies with one of the parent birds at the nest, as shown on the previous page.

In the ordinary course of things a thrush is a very easy bird to photograph, provided the naturalist and his apparatus be well hidden, for it is a bird of much deliberation, and will stand listening for minutes together.

Although I fondly imagined that this particular thrush's nest was out of the reach of feline robbers, it was discovered, and one of the farm hands, upon seeing a cat run away from the place, looked to see whether the fledglings were safe, and found some of their remains upon the hay-elevator.

A pied female blackbird had lived all the winter and spring in and about the paddock where the great tits bred, and we were very anxious to find her nest, with a view to photographing her from our tree-trunk. In due time we found it in a hedgerow on the far side of the paddock, and about a hundred yards from the farmhouse. It contained one egg. When four had been laid, and the bird had sat upon them for thirteen days and no chicks appeared, I began to fear that her abnormal appearance had perhaps prevented her from securing a mate. I was greatly desirous of saving the situation, in order that we might photograph her in the act of feeding her young ones, so went off and fetched an egg that was just



PIED BLACKBIRD FEEDING HER CHICKS.

chipping from another blackbird's nest and put it in. Two days afterwards I visited her and found five hungry little creatures in the nest, one of which was a wee bit bigger and stronger than the rest. We fixed up our tree-trunk, and very soon had a series of studies of her feeding her children, one of which is reproduced on page 67.

Two days after this my brother happened to be passing, and thought he would take a peep at the nest to see how things were going forward, as he heard a blackbird's alarm note ringing out near the spot. To his annoyance, the cat which had given us so much trouble elsewhere leapt out from the hedgerow immediately beneath the nest, and the young birds were quite cold and weak. He returned half an hour afterwards, to find the mother on the nest, but next day the chicks were all dead. This was on the 20th of April, and what follows is extremely interesting on account of the certainty with which it proves the short-lived character of a bird's grief, and the limited nature of the wanderings of a species. I found the same bird on the 30th sitting on a clutch of four eggs not fifty yards away in the same hedgerow. On the 12th of May two of her young ones had come out, and she ultimately succeeded in bringing off all four in safety. Her first nest had been in a very exposed place, and she was extremely shy whilst brooding; but her second was situated in a very thick bit of whitethorn, and she sat so closely upon it that I

had my face within twelve inches of her, and could see the white feathers of her face all soiled and dirty by coming in contact with the mould when catching worms. I begged the sparing of her life of more than one man who was desirous of seeing her behind a glass-case; and I hope, but I fear vainly, that she will live to build more nests and yield interesting facts to other students of Nature.

This, so far as I could ascertain, was the end of the mischief done by the cats, and I believe it was all perpetrated by the same animal—a dissipated-looking brown Thomas, which I saw one day on the roof of a high barn, trying, but fortunately without success, to rake out some young starlings from their nest under the tiles.

A heavy percentage of the other birds named as being found breeding within five hundred yards of a Greater London farmhouse were robbed by carrion-crows and boys. I was always taught in my young days, on well-kept Yorkshire grouse-moors, to believe that crows were very shy birds; but have since discovered that that depends very much upon the way their numbers are kept down by game-preserving. A friend of mine not long ago started out one fine spring morning from High Barnet across the fields, and from there to Shenley took no less than eighteen clutches of eggs belonging to this species. Last May a pair succeeded in building a nest, rearing and actually carrying off a brood from an orchard near to Elstree.

Carrion-crows are the Dick Turpins of the feathered world, and woe betide the small bird that builds its nest in an exposed situation anywhere in the neighbourhood of Elstree! During my residence in the district I do not think I can call to mind one instance of a moorhen succeeding in hatching off her first clutch of eggs. The species has to depend for its perpetuation on the growth of reeds and rushes which the old birds bend over their nests and thus hide their eggs. I knew a case of a bird building and laying twice in a pond this last spring, and having each nest promptly robbed by the crows. By the time she was ready to make a third attempt the reeds had grown sufficiently tall for her to bend them down, and so screen her treasure-house from inquisitive eyes above. In this way she succeeded in bringing off a brood. I often watched these chicks from behind a thorn-bush growing on the bank of the pond, and one day caught four out of five of them by what, if they could have been consulted upon the matter, they would no doubt have considered a mean little trick. As soon as they had come out from their hiding-places amongst the rushes fringing one side of the pond, I struck a bit of barbed wire in front of me with my stick, and the rattle of it sent them all scuttling back again. Making a mental note of where two of their number disappeared, I walked round and caught them and put them in my cap, where they protested loudly against bondage. As

I lay in hiding for the other three, I became aware of strange sounds proceeding from a little reed-bed on my right hand, where I knew one of their parents, at any rate, to be in hiding. It was just like a horse eating hay, and kept on in response to the calls of the youngsters in my cap. In a while I was joined by my brother, to whom I said, "Hark! do you hear anything?" After listening a while he said, "Yes."

"What does it sound like?" I asked.

"A horse munching hay," he answered.

I have no doubt whatever but that it was made by a moorhen, for when we released the young ones and they ceased to call and disappeared amongst the reeds, the munching sound stopped.

A HIGHLAND COTTER'S HUT.

CHAPTER IV.

BIRDS (*continued*).

During heavy showers of rain the females of many species hasten back with what food they have collected and, giving it to their young ones, sit down upon the nest, and spreading out their wings, allow the falling water to trickle harmlessly away outside the structure. This is often a good opportunity for obtaining a photographic study of them, although I have known my brother fail to make a picture through a lack of sufficient light, and the fact that the little crowd of protected fledglings were constantly heaving their mother's form or popping their inquisitive beaks from beneath her breast.

Last spring I was desirous of studying some of the ground-builders, and having photographs taken of them at close quarters in the act of feeding their young, so I conceived the notion of making the artificial rubbish-heap described in Chapter I. for purposes of hiding in. As soon as we had completed it we fixed it up at five o'clock one Saturday morning some eight or ten yards away from a skylark's nest, in the middle of a bare

ten-acre field. In the afternoon we moved it up to within three feet, and retired inside with the camera. In a few minutes along came the lark, and hovering over her chicks for a few seconds, like a toy-bird suspended on the end of a bit of elastic, called to them in twittering notes, at which signal of her presence they all shot up their heads and opened their orange-coloured mouths ridiculously wide. She quickly alighted, and running up gave each a small worm, which she appeared to fetch from the back of her throat. Generally, one of the worms which she brought was visible in her bill, but this was by no means always the case. When she had distributed her supply of food she waited for a moment, and then, thrusting her head into the depths of the nest, attended to its sanitary arrangements and flew away. I watched out of a hole on one side of the lens, and my brother out of one on the other. There was a strong breeze blowing at the time, and the lark always flew down it on her way to search for more food, and faced it on coming back. She heralded her return every time by a twittering call that was answered by her offspring, which she fed on an average once every quarter of an hour. Her brood was nearly ready to fly, and one of them, stronger and bolder than the rest, ran out of his little cup-shaped home and took up his station some fifteen yards away. When his mother returned she discovered him, and alighting

where he was gave him something to eat, and then proceeded to feed the rest of her children. I crawled out and brought the little wanderer back, and then returned to my hiding-place. When the mother came back again she alighted where her venturesome chick had hopped to, and after

SKYLARK, NEST AND YOUNG.

looking round and calling in vain she advanced to the nest. The next time she arrived with a supply of food she did not trouble to look for her wandering one, but flew straight to her nest. She did not appear to receive the slightest assistance from her mate, although I must say he sang very blithely over our heads on several occasions during the afternoon. One curious thing I noticed among the young larks was that whilst their parent was absent searching for food they were constantly stretching themselves and gaping. We

made a number of photographic studies, one of which is herewith reproduced, and is, we believe, the first mechanical picture ever secured of a perfectly wild lark at her nest.

Seeing a pair of starlings entering and leaving a hole in which they had their nest, containing a brood of young ones, in the thatch of a hayrick, we borrowed an old tumbril from the farmer upon whose property we happened to be at the time, and placing our artificial rubbish-heap inside it, wheeled it close up to the side of the rick, as shown on page 15. My brother got inside his hiding-place with his camera, and standing on the wheel nearest to the rick, I placed my hand where the birds alighted, and he focussed it and awaited their return. It was not long before one of them came back with a supply of food. I expected a long, wary, screeching reconnoitre of the greatly altered aspect of affairs; for a starling, although a bold bird, is an extremely cautious one, and will not go to her nest for hours together if she suspects anything wrong. But apparently our device was such a natural bit of farmyard property, that they never suspected it to contain anything in the shape of a man and a camera, and went about their business in the most unconcerned fashion. The male took his share of the work right manfully in this instance, and, of course, gave us an opportunity of making a photograph of him as well as of his companion.

FEMALE STARLING.

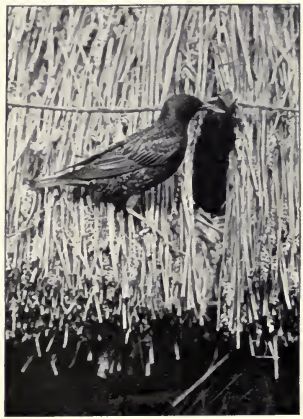
Just a fortnight after the brood of young starlings left the hole in the rick, I saw a pair of house-sparrows examining it as if they meant housekeeping, and a month afterwards they too were busy going in and out with food for a hungry family.

Although I believe, from observation, that in most instances the male starlings help the females to feed their young, such is not always the case.

I watched a female collecting "leather-jackets" on a newly-mown lawn last July for a long while, and as she seemed exceedingly busy, even for such a hard-working bird, I timed her efforts upon my watch. She had her nest under the slates of a house abutting on the lawn, and in consequence had not far to fly with the food she secured. During the first ten minutes I had her under observation, she fed her young ones four times in five minutes, but during the next ten she only averaged twice in five minutes. This was not,

however, due to any slackening of her efforts, but to the fact that she had been over the same ground several times before, and the supply was naturally growing limited. Sometimes she flew up to her nest with only one grub in her bill, but generally two and occasionally even three. As some of the "leather-jackets" took a good deal of persuading to leave their hiding-places in the hard-baked earth, the practical bird, upon discovering the whereabouts of a fresh one whilst she had a captive already in her possession, put the prisoner down upon the ground close by and let it lie there until she had extracted her new find.

Gardeners are sometimes disposed to be hard on starlings. It may be interesting to some of them to know that I watched that individual bird kill sixteen "leather-jackets" in ten minutes. As she did not appear to receive the slightest help from her male companion, I thought I would render her some little assistance, so,



MALE STARLING.

procuring a spade, dug a handful of worms from my own garden, and whilst the industrious bird was away at her nest, flung them over on to that part of the lawn she was working. When she came back she seemed a bit staggered. Such an array of luscious food where but a moment ago she had left absolutely nothing! The thing seemed above her comprehension. However, she soon fell to, and "jointing" two large worms flew off at once to her chicks with them and returned directly for another supply.

After this had gone on briskly for a while, the bird, for the satisfying of her own hunger, levied toll on the supply of worms I procured for her offspring.

The feeding habits of this species differ very widely from those of the blackbird. It is extremely interesting to watch birds searching for food; I often do it by the hour together. A blackbird hops about listening as well as looking for worms, but a starling rushes round just as if dear life and the welfare of the whole universe depended upon her individual energies. According to my timed observation, the latter feed their young ones twice as often as the former.

The different members of the tit family are, by reason of their boldness, easy and extremely interesting objects of study, and despite their quick movements, may be photographed in a good light with rapid plates and swift up-to-date apparatus.

LONG-TAILED TIT AND NEST.

During last May we found three bottle-tits' nests in the same hedgerow within a couple of hundred yards of each other. We visited them on several occasions late in the evening, and always found the male birds sharing the cosy little feather-lined nests.

As soon as they had young ones we went out and fixed up our artificial tree-trunk in front of one of them. When all was ready for action I retired to a distance and watched proceedings through my field-glasses. It was not very long before the female turned up with a number of flies in her bill. She hopped about rather nervously at first, but gradually drawing nearer to her little house of webs and lichen, entered it and stayed there. By-and-by the male came along with a supply of food, which he gave to his consort as she sat covering their family, but whether she in her turn passed it on to the hungry youngsters or not neither my brother nor I could make out, although we both saw from our respective quarters the supplies repeatedly passed in.

After a number of plates had been exposed in a light that was far too poor to make us sanguine about the results, the photographer signalled to me that he wished to be released. Upon walking up, I put my finger into the nest and the tit sat perfectly still until I withdrew it, when she came out in the most unconcerned fashion and began to hop about amongst the branches of a tree overhead.

As evidence of the excellent character of the hiding provided by our artificial tree-trunk, I was pleased to note, while I sat waiting, a turtle-dove

MALE CHAFFINCH AT NEST CONTAINING YOUNG.

alight within a few yards of it and begin to call, and a cunning old carrion-crow leisurely flap his way close past without having his suspicions aroused in the slightest degree.

Chaffinches have on several occasions alighted

upon it, and one day a robin actually rattled off his song from the top of our rubbish-heap whilst my brother was inside waiting for a bird of another species to visit its nest.

Our first attempt at photographing the bottle-tits outside their nest did not yield a satisfactory result, so we waited until the young ones were older and both the parent birds were busily engaged in feeding them, when the picture on page 79 was obtained.

Although chaffinches are bold birds and sit closely on their nests, they are by no means easy to photograph without the help of some sort of hiding appliance.

We had tried many many times to photograph a brooding female, and had often come within an ace of success, but at the crucial moment either the bird's courage gave out and she flew away, or some tantalising accident, such as the slipping of a twig, carefully bent out of the line of sight, scared her off with an angry "spink, spink, spink." Our new hiding appliances, however, speedily changed all this, and had we only had the time we could have made as many studies as we chose. The illustration on page 81 of a male which had just fed his chicks was taken in rather a dark place.

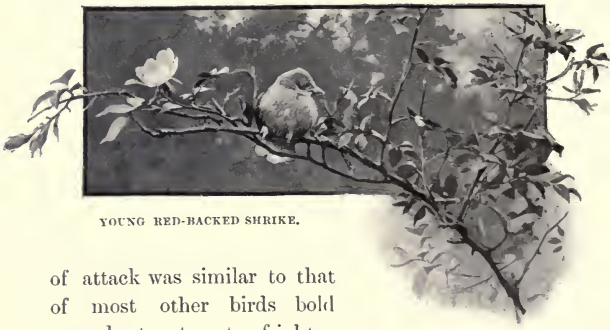
A closer study of the domestic life of birds by means of our hiding appliances has resulted in the discovery of the fact that the males of many species share family cares to a far greater extent

than I ever supposed. One day I erected our rubbish-heap close to a chaffinch's nest containing a brood of five half-grown young ones, and took up my station inside. The male bird fed the chicks four times for the female's once, and when he had distributed his harvest of caterpillars most impartially amongst his clamorous sons and daughters, he attended to the sanitary requirements of his little establishment.

Young fledglings often afford a great deal of sport when stalked along a hedge-side with the camera, and, as a rule, yield surprisingly pretty pictures when photographed; but, at the same time, they have a very provoking habit of suddenly remembering an engagement elsewhere, just when they have been focussed in the sweetest of all possible attitudes.

The picture on page 84, representing a young red-backed shrike on a spray of wild rose, was made soon after it had left its nest. The young of the species always proclaim their presence by their harsh notes when being fed, and their male parent is very bold in defending them. One day I was amusing myself by imitating a young rabbit squealing, as if it had been caught by an enemy, and watching the antics of the alarmed mother of a litter kick the ground with her hind feet, when I became aware of a bird darting at my head. It was a male red-backed shrike, close to the nest and almost fully-fledged young ones of which I

had wandered. He doubtless thought that I was interfering with his children, and like a plucky father endeavoured to drive me away. His method



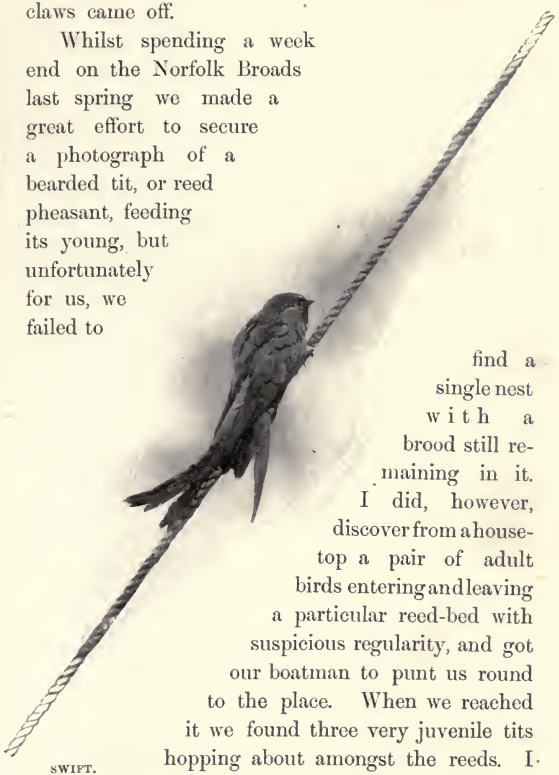
YOUNG RED-BACKED SHRIKE.

of attack was similar to that of most other birds bold enough to try to frighten human beings away from the precincts of their offspring—namely, from behind. Although I do not think he ever actually touched my cap, he swooped down from a tree in my rear, and passing over my head with an air-cutting whirr, rose into another tree in front of me.

Even such birds as swallows, martins, and swifts may sometimes be photographed at rest. During our stay in Unst last June a fishing-smack came into Baltasound one morning with the swift represented in the picture opposite on board. The poor bird had alighted in the boat's rigging when eleven miles out at sea during the night, and clung so tenaciously to the rope that when

the fishermen tried to disengage it, some of its claws came off.

Whilst spending a week end on the Norfolk Broads last spring we made a great effort to secure a photograph of a bearded tit, or reed pheasant, feeding its young, but unfortunately for us, we failed to find a single nest with a brood still remaining in it. I did, however, discover from a house-top a pair of adult birds entering and leaving a particular reed-bed with suspicious regularity, and got our boatman to punt us round to the place. When we reached it we found three very juvenile tits hopping about amongst the reeds. I dashed out of the boat after them on to a little floating island of tangled aquatic vegetation,



SWIFT.

but they were far too quick for me, and I got very wet, in addition to having several narrow escapes from dropping out of sight in the numerous water-holes studding the island, for my pains.

By dint of great patience we eventually succeeded in capturing all three, and, placing two of them inside my leather field-glass case, we tethered the remaining one very carefully to a solitary withy with some soft material I happened to have in my pocket at the time, and in such a way that he could not by any means hurt himself. At first he naturally resented being obliged to stay in one place, but after he discovered his inability to wander about amongst the reeds, which I must say he did very speedily, he settled down in a contented state of mind to wait for and enjoy the good things his parents brought him. A light breeze was blowing at the time, and when the adult birds drew near with a supply of food they sometimes rested for a few moments in the most grotesque attitudes I ever saw members of the feathered world assume. Grasping a tall reed in either foot, and poising their bodies perpendicularly between the two, they looked exactly like miniature gymnasts climbing parallel vertical poles. I was astonished at the great width of grasp they could make in this way, their legs sometimes appearing to shoot out almost at right angles to their bodies.

The male bird was far bolder than his com-

panion and fed his captive child until it would not open its bill for another insect, at which he appeared to become angry. I noticed that he hunted for his prey close down to the water amongst the reeds. In addition to not being so

ROBIN'S NEST IN BASKET.

bold the female could not be credited with the same amount of industry, and often swallowed the supply of food she had ostensibly brought for her chick. The fact of the male bird feeding his captive young one until it would not look at the food he brought it may to some extent explain why all the members of a brood get a sustaining

share—those that become satisfied first hang back and give their hungry brothers and sisters a chance. I am more inclined to believe this than that a bird, only fetching one caterpillar at a time to a family of seven or eight, knows each

GREAT TIT GOING TO HER NEST INSIDE A DISUSED PUMP.

chick, and remembers upon every visit exactly which had the proceeds of his or her last journey.

As soon as we had made a few studies, one of which forms the frontispiece to this work, with the camera and its operator hidden among the reeds, we released all the little captives, and they went off with their parents as happy as could be.

Many species of birds seem to have a positive liking for curious nesting-places, and thus afford opportunities for the photographer to secure pictures of two-fold interest.

The illustration on page 87 represents a robin's

WREN'S NEST IN ROPE.

nest and eggs in a little fancy hand-basket which had, after growing old and faded, been relegated to a shed at the rear of a Hertfordshire village hostelry. It provided a soft foundation for the nest on account of its containing the feathers of a

barn-door fowl, which had been killed and plucked into it the previous winter.

The majority of the members of the tit family have a proneness to build in such odd situations as letter-boxes, street-lamps, and disused old pumps. We have met with several pairs of great tits breeding in the last-named quarters, and it is great fun to fix up the camera and endeavour to photograph the busy creatures entering and leaving a spout whilst tending their young. It is a good plan to bar the hole up with something whilst they are away, and snap off directly they return, for they then remain still for an instant considering the obstruction. The picture on page 88 was secured in this way, but not until considerable patience had been expended upon the subject. Finding it impossible to photograph either of the parent birds as they went in and out on account of their uneasy habits and very rapid movements, we thrust a large leaf up the spout of the old pump. Instead of firing directly the astonished creature stopped for a moment to examine the nature of the barrier, my brother dallied in expectation of a better chance. It never came. The practical little bird placed the food she had brought on the top of the spout, went inside, hauled the leaf out and dropped it, seized the caterpillar she had brought, and straightway went about her business. The leaf was promptly replaced, and when the tit returned a vigorous squeeze upon the air-ball

dominating the rapid shutter secured her portrait, just as she peeped inquiringly inside the circular leaden passage to her nest.

Towards the end of last May I was shown a great tit's nest built inside an old one, belonging to a thrush, situated in an open hedgerow. It contained a large family of recently-hatched young ones, which were being assiduously fed by their parents.

Common wrens sometimes select odd quarters for their nests, and do strange things in collecting material wherewith to build them.

I watched the building of the nest figuring on page 89, and as the tiny structure was never lined with feathers, I presume it belonged to a male bird. The coil of rope was hanging up inside an ancient and somewhat dilapidated hay-binding shed, on the door-hinge of which a nest, very closely resembling an accidental collection of old hay, was ultimately built and used for breeding purposes. I used to think that wrens were clever enough to hide the whereabouts of their nests by building them of such materials as harmonised with surrounding objects, but a more extended experience has shaken my faith in their wisdom. Whilst the female was brooding on the nest mentioned above, her mate amused himself by building three "cocks' nests," two in the sides of a rick a few yards away, and one in a neighbouring cart-shed. One of those in the rick had all its outside made

of green hay, evidently plucked from the hole in which it was built, but the other had all or nearly all its outer wall made of dead leaves, gathered from a ditch close by, which rendered it a very conspicuous brown object.

ROOKS' NESTS.

The wife of a country friend of ours one day threaded a sewing-needle with black cotton in her bedroom, and hearing one of her children cry out downstairs, laid it carefully on her dressing-table and hastened below to see what was the matter with her bairn. Upon returning to do her mending she was astonished to discover that both needle and thread had vanished. A few days afterwards her husband and my brother found the thread

interwoven in a wren's nest, from which the needle dangled down, in a creeper at the back of the house. The bold bird had entered the bedroom through the open window during the lady's momentary absence and snatched up what she, no doubt, considered eligible building materials.

HOUSE-SPARROWS WAITING BREAKFAST.

On page 41 we gave an illustration showing our method of photographing "among the slender branches." Our picture of the "Rooks' Nests" represents one of the many results obtained with the camera on the ground.

To those who do not live far out of large towns, and have but few opportunities of photographing a wide range of bird-life, I would strongly recommend a trial upon house-sparrows, hedge-sparrows, robins, chaffinches, and tits, which in winter time may

generally be met with in any suburban back garden, where a fair degree of quiet and a supply of food prevail. We sometimes place our camera on a rough wooden grocer's box in the garden, and focussing a few pea-sticks on which birds are in the habit of alighting, cover it over with an old sack, and throwing a few crumbs down close by, retire indoors, with the ball of the pneumatic tube in hand, to wait. The house-sparrows on page 93 were photographed in this way, and when the study had been made, one of my little daughters, a child of six, having heard of catching birds by placing a pinch of salt on their tails, thought that she would try her hand at capturing some of the dickies. Procuring a supply of salt and some bread-crumbs, she placed a quantity of each in such situations that a bird engaged upon eating the one would be likely to touch the other with his tail, and retired indoors to wait and watch results. Our servant, a big Lincolnshire lass, took a great deal of interest in the matter, and very gravely asked my wife how a pinch of salt on a bird's tail could secure it—did it fascinate the poor little thing?

When snow is on the ground we always feed the birds liberally, and in photographing them hide the camera beneath a white sheet or tablecloth.

There is a great deal of very interesting natural-history work still to be done in the direction of studying the tracks of wild creatures in the snow. I remember with what pleasure, when a lad, I

WALKING.

HOPPING.

BIRDS' TRACKS IN SNOW.

learnt to distinguish a hare's footprints from a rabbit's.

During the short stay of the snow which fell during the blizzard we experienced in March of this year, my brother endeavoured to make some permanent records of the tracks of birds, but failed on account of the lack of contrast between the parts of the snow pressed down by the toes of the creatures and the rest of the white field around. I accordingly secured a supply of fine sand, dyed it black, and placing it in a bottle ran a quantity carefully through a narrow nozzle into the indentation made by the down-pressed toes of the birds. We photographed the tracks of a rook and a blackbird by this means, and reproduce herewith the results which we obtained. Having a foot-rule in my pocket, I measured the stride of the former bird, and found it to average six and a half inches, and the hop of the latter nine inches.

Probably the most satisfactory birds for the student of ornithology to commence to photograph are sea-birds. They generally congregate during the breeding season in considerable numbers at some favourite and well-known spot; as a rule they are easily approached with a camera, and make interesting pictures on account of their graceful forms, contrasting colours, and surroundings. In stalking them with the camera, absolute quietness is necessary, and it is often imperative to approach them by inches at a time rather than feet, but

it is satisfactory to know that care and pains bestowed upon them are generally rewarded.

The Farne Islands, off the coast of Northumberland, form by far the best all-round sea-bird station in England. Permission to visit them is easily

TERNS ON THE WING.

obtained from Mr. H. A. Paynter, of Alnwick: boats are generally procurable at Sea Houses, and the watchers on them are most courteous and obliging fellows. The following birds and their nests eggs, and young may be photographed there:—Cormorants, lesser black-backed gulls, herring-gulls, kittiwakes, guillemots, puffins, eider-ducks, oyster-

catchers, ringed plovers, Sandwich, Arctic, and common terns. The last three species provide endless sport for the flying-bird photographer, and a visit to the island whereon they all breed together can never be forgotten. The picture on page 97 is one of a series we made there one not particularly suitable day.

Eider-ducks breed on all the islands boasting anything in the nature of suitable cover, and whilst brooding are so tame that they will in some cases allow the naturalist to stroke them. This confiding characteristic of course affords the amateur photographer a grand chance, and if he does not secure a good picture I am quite sure it will not be the duck's fault. I passed my hand down the back of the bird represented on the opposite page, both before and after my brother made the study, and without in the least disturbing her.

The Bass Rock, a little further north, is an excellent place whereon to study gannets or solan geese, amongst the nests of which the visitor may walk with the utmost ease, in one place at least, and photograph the stately old birds and their eggs or young to his heart's content. Mr. Mackenzie, of the Canty Bay Hotel, which is right opposite, rents the Bass, and ferries visitors over by means of his own boats and men, and in fact does everything in the power of a kindly Scotsman to help forward the interests and enjoyment of anyone desirous of visiting the majestic old crag.

Ailsa Craig, on the West Coast of Scotland, is a capital bird-rock, but is difficult to get about on because of the loose nature of the earth and stones on its upper parts; however, Girvan, the cragsman, who lives upon it, is a very careful

EIDER-DUCK ON NEST.

fellow, and knows every inch of its traversable parts. At the same time it is well to impress upon the youthful naturalist the necessity of taking care of himself whilst upon it. My brother, mainly through being too venturesome had a very narrow escape from sliding over a cliff three or four hundred feet deep when we were visiting it.

The Hebrides will well repay a visit, and are

thoroughly accessible from Oban as a centre. Our good friend Mr. Bisshopp, the naturalist of the town, is always ready to give advice in regard to the places to visit and the best men and boats to employ.

St. Kilda is a grand place to visit for sea-birds, and the natives, contrary to report, will take the naturalist wherever he likes to go, provided the weather is sufficiently calm for them to use their boat.

Both the Orkney and Shetland Islands are rich in sea-bird life, and boats and able guidance are, as a rule, procurable for hire.

A GROUP OF PUFFINS.

YOUNG GULL ON CHIMNEY.

It is great fun to stalk puffins at rest on a rock, some lying down sunning themselves in contented repose, and others looking inquisitively at the photographer and his apparatus. I have sometimes stood a little distance away and watched my brother creep up quietly inch by inch to a group similar to that opposite, and laughed outright at the foolishly comical figures the wondering birds cut with their grotesque beaks.

Whilst working the Shetlands during our holidays last summer, we visited the famous Noup of

WHERE KITTIWAKES BREED.

Noss, which is a perfect sea-fowl paradise. The kittiwakes sit in long lines upon the narrow ledges formed by the wearing away of the rock, and, in one or two places, may be photographed at fairly close quarters. The illustration opposite was

GULLS FEEDING—A SCRAMBLE FOR BREAKFAST.

obtained from the top of a tremendous boulder, thrown high upon a number of others by some storm, and shows the peculiar conformation of the rocks on the ledges of which the birds were breeding.

Immature gulls of various species hang round harbours and fishing-stations all through the spring and summer, when the rest of their kindred are away busily engaged with family cares. Their

ravenous appetites and bold familiarity generally afford plenty of scope for picture-making. We were hung up for a couple of days at the Queen's Hotel, Lerwick, by rough weather, and amused

YOUNG GULLS WAITING FOR MORE BREAKFAST.

ourselves by feeding and photographing a crowd of hungry young gulls, that were for ever hanging about the bay at the back of the house. Every morning during our stay the bird figured in the illustration on page 101, perched himself upon the chimney, invariably standing on one leg, and waited until he saw something like feeding going

on below, when down he came with a swoop and a splash. His portrait was secured from a landing window.

We discovered that of all kinds of dainties dear to the sea-gull's maw, a piece of cod's liver

GULLS ON THE WING.

is the most prized, and it was laughable to see the scramble for each piece as we tossed it into the bay from the billiard-room window of the hotel. The illustrations representing a wait and a scramble were both obtained with the camera resting in a scuttleful of coals, which we lifted on to a window-seat, it being quite impossible to use the tripod.

Gulls, like salmon and sea-trout, delight to visit bodies of fresh water periodically, because it has the very desirable effect of killing the parasites living upon their bodies. At any time during the summer two continual streams of sea-birds of different species may be seen all day long crossing

GULLS FLYING AWAY FROM LOCH CLIFF.

a piece of land dividing Loch Clift in Unst from the sea. One stream represents birds going to wash and the other those returning. After washing in the fresh water, the birds rise, shake themselves in mid-air, and retire to preen themselves, facing the wind on a neighbouring hill-side; and the accompanying picture shows them in the act of flying away.

Two extremely interesting birds to study are

RICHARDSON'S SKUA SOARING.

the great skua and Richardson's skua, both of which get a good deal of their living by a reprehensible method of marauding. Upon seeing a gull catch a fish and swallow it, they chase him until he disgorges it, when they promptly appropriate it. I watched

three members of the latter species rob a poor little kittiwake of the just proceeds of her labours one day, and they reminded me of so many sooty fiends. When their breeding grounds are visited they swoop at the head of the intruder, or hang in mid-air facing a stiff

GREAT SKUA PREPARING TO SWOOP.

breeze of wind, such as was blowing when the lower picture on the previous page was made.

The great skua, or bonxie as it is called in the Shetlands, breeds on Foula, where it is protected by Mrs. Traill, and also in Unst, where our friend, Mr. Laurence Edmondston, is carrying out the traditions of his worthy forefathers, and earning the gratitude of all British bird-lovers by keeping a watcher at his own expense on the top of Herma Ness to look specially after the nests and eggs of the thirteen or fourteen pairs of birds breeding on his property.

The bonxie makes a great impression upon the naturalist when he beholds it for the first time.

Upon the occasion of our visit, Mr. Edmondston kindly accompanied us to Herma Ness, and when we drew near to the first nest, which his watcher showed us, a large brown bird began to hover over our heads and make stoops at the one happening to be nearest to her charge. When she was joined by her mate she became much bolder and attacked with great fierceness, but invariably from behind and with her head to the wind. Directly she passed over the intruder, she rose gracefully in the air with outstretched pinions, and wheeling round to leeward made ready for another descent. She generally appeared to make her terrific downward rushes from an altitude of about two hundred feet and a distance of seventy or eighty yards, and when she got close up to her enemy dropped both feet

GREAT SKUA ATTACKING WATCHER.

and struck him on the back of the head with them as she passed over.

One pair of birds, having a newly-hatched chick and chipped egg in their nest, were particularly

EGG AND YOUNG OF GREAT SKUA.

demonstrative, and repeatedly knocked my cap off; the blows they struck—for male and female both joined in the attack—stung very sharply.

Some idea may be gathered of the great speed at which these birds fly when making a swoop at the intruder, when it is mentioned that my

brother was working his fast shutter at a speed equal to one-six-hundredth part of a second, and that in the photograph of the watcher's cap falling off his head after being struck, the bird had managed to get out of the plate altogether, with the exception of the tip of one wing.

The number of pairs of birds now breeding on Herma Ness is double what it was in the late Dr. Saxby's time.

WATCHER'S CAP KNOCKED OFF BY SKUA.

Mr. Edmondston informed me that occasionally, when a nest gets filled with water during heavy rain, the birds remove their eggs to new and drier quarters. I noticed several mock-nests about near those containing eggs.

When visiting the great skuas on Herma Ness, a grand view may be obtained of the Muckle Flugga rock, which marks the most northern point of the British Islands, and rather befittingly forms the tailpiece to this chapter. Whilst the photograph of it was being taken, I was delighted to see a few fulmar petrels flying round the cliffs. They are easily distinguished from the gulls when on the wing by their peculiar gliding graceful flight. I was already aware that a number

had established themselves as annual breeders in the Shetlands, and felt sure that the individuals I saw had nests—if the places where they deposit their single egg can be called nests—in the neighbourhood, and a few days later met a gentleman on a steamer conveying us south who told me that he had just taken fulmar petrels' eggs in the cliffs facing the Muckle Flugga lighthouse.

MUCKLE FLUGGA: THE MOST NORTHERN POINT OF THE BRITISH ISLANDS.

CHAPTER V.

MAMMALS.

THE list of wild mammals which we can still boast in this country is by no means a bad one, considering the fact that we live on a couple of small, densely-populated islands. Most of the members composing the list, however, are as difficult to photograph as their habits are to study, mainly on account of the fact that nearly all their movements take place during the hours of darkness.

Hares are exceedingly interesting creatures to study on account of their curious habits, many of which seem to be based upon principles involving the use of considerable intelligence. Although they are very timid, it is under certain conditions quite possible to photograph them when young.

In the season of love-making I have watched them hunting each other and gambolling around during the hours of broad daylight in the most frolicsome fashion. Night, however, is their time of greatest activity. They rise from their forms at dusk and stretch themselves, and in hilly moorland districts descend into the valleys, where the most luscious grass grows, to feed. I have

frequently traced hares from their feeding-ground, which they visited every night, at the bottom of a Yorkshire dale, to the peat-hags on the hill-tops a distance of over two miles away, where they rested during the day. When hares are going to seek their day or sleeping quarters, they practise a very ingenious trick in order to mislead and baffle their enemies. This consists of travelling for some distance in a direction they have no intention of pursuing, and then doubling back exactly along their own track for a good way, and suddenly leaving it by making a tremendous sideward bound to right or left. This being accomplished to their satisfaction, they trot off at right angles to the path they have just left, and go to their forms. Occasionally a very cautious animal will repeat the trick once or twice the same night before going to rest, and when but a light sprinkling of snow is lying upon the ground, or places have been swept bare by the wind, the "double" is very puzzling. I have always found the best way to pick up the track again is by making a circle of sixty or eighty yards round the place where I lost it.

Hares are very fond of old haunts, from which they can hardly be driven for any length of time by the most persistent persecution, but they do not like ground infested by rabbits. They have a curious habit when hunted by hounds of returning, sometimes after a very long chase, to die close to the form from which they were disturbed. I once

LEVERETS IN THEIR FORM.

saw one, after giving a long run, jump on to a stone wall five feet high, and die there long before the hounds reached the spot. When they did come up she simply rolled off an inert mass into the first dog's mouth that seized her.

I have often watched both old and young hares scampering fearlessly about in Lord Aldenham's grounds, close to Elstree, during broad daylight when it would have been quite possible to photograph them with a telephoto lens.

Sometimes young hares will lie very close in their forms, and I have seen them, on several occasions, picked up when more than half-grown We were very anxious to photograph one of these close liers, and came within an ace of succeeding one day, when our purpose was defeated by a curious accident. A keeper and I had found the sitter between two rows of spring wheat, and standing back we beckoned my brother, who was searching some distance away, towards us. In advancing he disturbed an adult hare, which ran right over the leveret, and scared it away. We asked the game-watcher to telegraph to us if he should ever be fortunate enough to find any young leverets in their form, and one morning my brother received a welcome summons at his office in Fleet Street. An old shepherd had found us a couple of sweet little baby hares in a big tuft of pasture-grass at seven o'clock, but when the photographer reached the place between eleven and twelve they

had both been moved away, and his heart sank within him. Luckily, a close search revealed them, as shown in our illustration, but about a dozen yards away from the original spot. Of course, the tuft of grass was opened out so as to show the animals. As an instance of what may be done in this not inaptly-termed journalistic kind of photography, my brother was back with a negative for my inspection in the City between four and five o'clock, although he had journeyed to and from Elstree by train, and walked an aggregate of at least six miles.

Rabbits are probably the easiest British wild mammals we have to make photographic studies of, and are wonderfully interesting creatures to observe. I have lain for hours together on a summer's evening watching them play round their burrows in the ruddy glow of the sinking sun. Their gambols are infinitely pleasing. A more than ordinarily frolicsome young bunny will at times, as if in sheer mischief, jump right over the back of another of a more sedate character. I fear I must plead guilty to having often given rabbits a bad fright. I have gone and lain in a dry ditch close to a wood swarming with them of an afternoon, and when fifty or sixty got out into a field close beside me, I have squealed out in imitation of one being killed just to see them bound away.

It is a great piece of fun to steal quietly up

to a burrow round which young rabbits are playing, and lying down put a finger to the lips, and by drawing the breath sharply through them reproduce a squeaking kind of note resembling the cry of one in distress. As a rule, all the little creatures go to earth in a great hurry, and their mother, advancing boldly with her ears erect and an angry look in her eyes, kicks the ground violently with her hind feet. In this way I have drawn them to within a few yards of me, and when they have eventually gone to seek safety in their subterranean homes, I have still heard them thumping the ground.

RABBIT.

By focussing some well-used burrow about three or four o'clock in the afternoon, and carefully hiding the camera and its operator, most interesting studies of rabbits may be made We have sometimes dug a hole for our apparatus near a much

frequented burrow, and another at some distance, for the photographer to lie in with his field-glasses and pneumatic tube; but this is not at all times necessary, as we have obtained equally good pictures by other means, such as piling up a few sticks, bushes, and sods, and leaving them a day or two before attempting to hide the camera behind them. This allows the animals to get accustomed to the sight of the obstruction.

It is very doubtful whether a successful sun picture could be obtained of either a stoat or a weasel at large, unless their nesting-places could be found and watched.

A keeper of Lord Aldenham's told me that one day whilst sitting quite still near a pheasant's nest, situated in the side of a hedge-bank, he was astounded to see a stoat come along and take two eggs from beneath the brooding bird without disturbing her, and roll them into the ditch. He killed the thief, and recovering the proceeds of his robbery, neither of which was broken, placed them under a barn-door fowl, and they were hatched out in a couple of days. The pheasant also succeeded in bringing off five chicks. The same man—who was a very intelligent observer, and could boast an education above his station in life—also told me that he once watched a male stoat climb up to a blackbird's nest in a hedgerow and take out a young one that was almost ready to fly, and carry it off to his own home in an old stump, where he

had a very promising family of seven sons and daughters.

We used to have a lot of stoats and weasels between Barnet and Elstree, and I have frequently had the latter chatter at me when I have disturbed them; but a change of gamekeepers soon thinned their ranks.

In the winter time, when the weather is severe, weasels often take to barns, and levy toll upon the rats and mice living therein. In the days of my youth, when engaged in farming, I have traced both them and their would-be victims in what appeared to be a wholesale migration through the snow from one barn to another. They occasionally take up their quarters in a mole's nest, where they store up the bodies of their subterranean prey. I remember, whilst tracing a fox in the snow on the Yorkshire fells, I came across a place where he had scratched up a weasel's larder containing the carcases of several moles.

Great difficulties beset the path of the photographer who undertakes the task of getting a picture of an adult fox at home, although the animal may be studied sometimes at comparatively close quarters. I once watched one from behind a hedge in Surrey playing with the leg of a rabbit, just as a puppy would with an old slipper. He picked it up, shook it from side to side, flung it up in the air, and capered around in great lightness of heart, until his eye suddenly fell upon

an old cock-pheasant which had walked out of a wood bounding one side of the field. This instantly changed his behaviour from gay to grave, and dropping the rabbit's leg he crept stealthily into the ditch nearest to him and disappeared. The pheasant walked about for a few minutes with his head erect as if he smelt mischief in the air, and presently rocketed skywards. For a moment I saw the head of the fox peep up from the ditch just behind where the bird rose. He had allowed himself to be seen, and in consequence missed his quarry.

I have watched half-grown cubs playing about upon a collection of rough rocks—amongst which they had been bred—on a northern moor, long before my brother's photographic days, and have not the slightest doubt but a litter of young foxes at play could be photographed by the exercise of a little trouble and patience.

If wild animals could insure their lives heavy premiums would be the order of the day, for great numbers of them die through accidents. I have known two litters of young foxes drowned in a ditch into which they fell upon emerging from their parental lair, situated in a hedge-bank.

Although there are still a fair number of badgers left to us in this country, some of them dwelling as near London as Epping Forest, their nocturnal habits and underground abodes render them difficult subjects to study.

Otters, too, are fairly numerous but exceedingly alert creatures, as I have discovered again and again when trying to come to close quarters with one which I knew to sleep on the top of an old stump overhanging a pool on the River Mole. However, it would seem that we shall one day have a photographic study of the animal, for quite recently some unsportsmanlike slayer, discovering a member of the species asleep on a stump, went off and armed himself with a pitchfork, with which he returned and killed the poor animal.

The habits of the ordinary brown rat are not very difficult to study if the observer will but stand quite still near its haunts on a summer's evening. It is, in addition to being a cunning brute, a fierce and quarrelsome one, and sounds of open strife are often to be heard. Brown rats are very spiteful towards water-voles, but in flying, which they do very precipitately from their ill-treatment, the latter always quickly elude pursuit by diving.

We have tried harder to get a photograph of a common brown rat than of any other living thing, and although we have come very near to succeeding on several occasions, something has failed us at a critical moment.

During the whole course of our wanderings up and down the British Isles we have only fallen in with a single specimen of the old British black

rat, and that was in Norfolk, where I understand it is on the increase.

It is a curious thing that rats have only

WATER-VOLE.

within recent years found their way into Unst, the most northern of the Shetland Islands, through the wrecking of a ship, and that bats, frogs, and toads are entirely unknown in any of the group.

I love to sit and watch water-voles swim across a sluggish river with pieces of grass in their mouths, like little beavers; or sitting on

their haunches upon some half-submerged branch, munching bits of succulent weed, which they have dived to the bottom of their native pond to secure. They are very fond of a floating bit of plank to rest upon, and look exceedingly comical when sitting up and washing themselves. I know a little pond in the banks of which a number live, and sometimes afford me great fun. When they run out into the field along their well-worn tunnel-like tracks through the grass, I creep quietly upon my hands and knees along the edge of their aquatic home until I cut them off, and then crawl after them. When doing this I have sometimes known them clap as flat as pancakes, and look up at me with their nervous little dark eyes.

Our illustration of the rodent was obtained by hiding the camera and photographer on the bank of a pond, and waiting until one came out of his burrow and entered the field of focus.

A year or two ago, whilst my brother and I were engaged in photographing a nightingale's nest situated in a small Hertfordshire copse, we heard a faint chirruping cry, as of a young pheasant in distress, proceeding from a dry ditch close by. Upon investigation we could see the dead leaves heave every time the sound came forth, and by-and-by discovered a chubby little red head peeping out. We were greatly puzzled with its appearance, and could not even guess at what it was until we recovered it, when it turned

out to be a young squirrel badly bitten in its hind-quarters. Although it had its eyes open it was too young to have travelled far without assistance, and as we conjectured the nest to which it belonged could not be a great distance away, we made a cast round to find it, and speedily succeeded in doing so. It was situated some thirty feet from the ground, in the fork of an ivy-clad beech-tree. My brother went up to investigate, and discovered that the nest, which had been built of soft dead grass, strips of fibrous bark, and withered leaves that had been gathered green, was in great disorder, and only contained the tail of a baby squirrel. In descending the tree, however, he fell in with a third youngster, clinging in a most terrified state of mind to the ivy, but, happily, otherwise quite unharmed.

We carried the pair home and fed them with cow's milk, which we poured into the palm of the hand and then dipped their noses in until they learnt to lap. I dressed the wounds of the bitten one, but he never appeared to get over them, and in a fortnight or so died, to the great grief of my little daughters, who are excessively fond of animals. The other grew up a fine strong fellow, with a handsome bushy tail. He used to roam all over the house, and one of his especial delights was to play the piano by running backwards and forwards at a great rate across its keys. Nearly every evening when I

HEDGEHOG ROLLED UP.

HEDGEHOG.

came home from the City he used to overhaul my pockets for Spanish nuts, with which he mounted to one of my shoulders and sat up to eat.

One day I borrowed a ferret in order to dislodge a troublesome rat that had taken up its abode underneath my fowl-house, and happened to unbag him in the presence of the squirrel. At sight of the attenuated white thing he ran up a window-curtain, and seating himself at the end of the pole supporting it, began to swear dreadfully and kick his seat just like an angry rabbit.

It is a very pretty sight to see squirrels in the autumn leave the woods and come down into the fields after acorns. They do not carry their tails over their backs when upon the ground, but indulge in a peculiar undulating method of progression, which cannot very well be mistaken for that of any other animal.

Hedgehogs are common enough, and very easy to study when they come forth from their hiding-places in hedgerows and woods in the evening time. I remember once, whilst lying up for rabbits on the edge of a very large wood in Cumberland, seeing them come out into an open pasture in surprising numbers. They are easy enough to photograph in their favourite attitude when under observation; namely, that of a prickly ball, as represented on the previous page; but a patient and silent wait is generally necessary to secure a picture showing their heads and feet.

Moles are numerous in most parts of the country, but are not often seen on account of their almost exclusively subterranean habits. They are for their size probably the strongest, most savage, and ferocious animals on the face of the whole earth, and it is appalling to think what terrible monsters for mischief they would have been if created as large as elephants. If a mole be allowed to bury his head and fore-feet beneath the ground, it has been proved that his strength is so enormous that he can drag a lump of lead after him, bulk for bulk, as large as himself. An ingenious but rather cruel experimenter in the North of England once allowed one to hang a dog which he wished to destroy, by tying one end of a strong piece of string to its hind-legs, and placing the other in a running noose round the poor dog's neck.

I do not think that moles catch many worms whilst they are at work boring their tunnels, for the least vibratory movement in the earth sets every worm near at hand to instant flight, as anyone may prove by the following simple experiment:—Insert an ordinary three or four-pronged garden fork in the ground, and then strike the shaft with the hand so as to set up a slight quivering in the earth. This motion is undoubtedly similar to that which is produced by a burrowing mole, for every worm near at hand will immediately scamper to the surface in a great state of alarm.

In very droughty summers moles may sometimes be seen upon the surface of the ground and caught before they can escape. The one represented in our illustration was captured and photographed by my brother near Enfield, whilst

MOLE.

straying about on the hard-baked surface of the earth. I have once or twice seen them whilst sitting quietly under a hedge, come out for leaves, doubtless for nesting purposes. They may be easily caught alive at any time when throwing up a hillock of mould by driving one's boot-heel hard down upon their tunnels, just behind where it is calculated they are at work, and then swiftly pulling the surface of the earth away. I have

secured specimens a good many times in this way, but, of course, approach to where they are at work must be very carefully made.

Not long ago I caught one in a field close to London in this way, and took him home in my pocket and turned him loose in a zinc pail full of mould. He instantly burrowed out of sight, and I saw no more of him for two or three hours.

In the dusk of evening, however, he began to bestir himself, and I could hear his claws scraping against the sides of the pail. I knew that he was hungry, and at once commenced to search for some acceptable morsel in the way of a supper for him. I was fortunate enough to find a number of large blackbeetles feasting on a piece of fat mutton at the bottom of a jar, and turned one out upon the mould in the pail. He raced wildly round and round once or twice, and then hid up in the shadow of a wee clod. Directly he stopped the mole's little red snout popped up right beneath him, and he quickly disappeared. I was greatly astonished at the precision with which the mole located the position of his prey, and tried the experiment over and over again, but always with the same result.

Of course, it is very difficult to say whether his movements were guided by scent or sound; I am inclined to think the latter, but in either case the marvellous knowledge which he displayed in

locating his victim, and the dexterity of his movements, were subjects for wonder.

It is said that a mole cannot live for more than twelve hours without food, and from personal experience I am inclined to credit the statement.

Although most people, and especially women, appear to abhor house-mice, they are pretty little creatures, with interesting ways, which we seldom have an opportunity of studying on account of their cunning and timidity, brought about by a long, long period of persecution. A year or two ago I had a mouse in my office which used to come out of its hole and scamper all over the room during the luncheon-hour when I had no callers and all was quiet. One day I placed a bit of cheese inside my leather hand-bag, and, opening it, thrust the end of a stick of lead-pencil in the gape just by the hinge, with one end protruding, so that I could quickly snatch it out and allow the bag to close. When all was still he came out of his hiding-place and ran round and round the bag several times, then jumped upon it and sat for ever such a while, and eyed first me and then the cheese, as much as to say, "No tricks now; is it fair and square?" Finally, he popped inside, but instantly sprang out again to see if all was right. The next time he went in he stayed and, creeping up on tiptoe I very quietly snatched the pencil away, and the bag closed and made him a prisoner. Did I kill him? Not a bit of it,

poor little chap. I could not find it in my heart to do that, and he was soon at liberty again.

Another became so tame in one of the packing-rooms of the establishment where I am employed that the porters fed him and regarded

NEST OF HARVEST MOUSE.

him as a sort of regimental pet, until one day his boldness cost him his life. A stack of parcels fell over and crushed him to death in the middle of a meal.

The accompanying illustration of a field-mouse's nest was made from a specimen which we found in a hedge-side. I am inclined to think that, like wrens, they make many they never intend to use

for breeding purposes. I have met with several in the disused old homes of blackbirds and thrushes.

During last spring we left our artificial tree-trunk rolled up in a friend's garden for a week or so, and when we came to use it again found

BAT.

a beautiful mouse's nest inside it. Our interest however, in the structure was rather cooled by the discovery that it was composed in great part of the strings with which we tied the various parts of our contrivance together.

Bats both great and small are to be met with in most parts of the country where trees prevail, and may be photographed in their dismal hiding-quarters by the aid of magnesium flashlight.

When at rest they hang head downward, as shown in the picture on the previous page, but generally with their wings closed, and I have come across a dozen suspended in a cluster to the roof-timbers of old buildings.

Fallow, red and roe deer are all to be found as near London as Epping Forest, and careful stalking with a hand-camera would doubtless yield pictures. My brother tried one day with his tripod double-lens apparatus, but the animals were too quick for him.

From the stately and leisurely way in which stags I have watched come down from the mountains to drink in a Highland loch during the very early hours of the morning, I should say that photographs might be made of them with the telephoto-lens.

A herd of wild cattle still roam in Chillingham Park, Northumberland, where they have lived and bred for the last six hundred years at least, according to well authenticated history. Unlike our various breeds of domestic cattle, they feed at night and rest by day.

They have a peculiar habit of galloping round strangers approaching them, and decreasing the diameter of each circle until it is unsafe to remain in their proximity. Strangely enough I have frequently known this trick performed by domestic cattle when visited in a large pasture by night.

There is a herd of goats that have gone wild

on Ailsa Craig, also another in Mull; and a flock of perfectly wild sheep, sprung, it is thought, from a few domesticated specimens left by the Vikings, have grazed upon the little Isle of Soa, one of the St. Kilda group, for something like a thousand years.

THE HAUNT OF THE KINGFISHER.

CHAPTER VI.

INSECTS AND OTHER SMALL DEER.

One of the most interesting branches of natural history photography is that devoted to insects. It does not demand any great physical strain or undue nerve tension, and with a little patience and skill can be made to yield exceedingly pleasing results.

Although butterflies are lively, airy subjects, they may, under suitable conditions, and with a certain amount of care, be approached and photographed at close quarters.

One afternoon, during the early part of last April, whilst reconnoitring the breeding haunt of a particular pair of birds, the nest of which we were very desirous of finding, we suddenly fell in with a number of small tortoiseshell butterflies that had no doubt hibernated during the mild winter in some old tumble-down sheds close by. My brother approached one of them with his camera, but the sun being out it was of no use, for the insect flitted from place to place in the most fickle fashion. By-and-by a cloud came over the sun, and the butterflies, of which we had quite half a dozen within a

SMALL TORTOISESHELL BUTTERFLY.

few yards of us, remained still where they had alighted, spreading their wings out and displaying their array of beautiful colours. We made one study of the insect nearest to us as it rested on a piece of an old mowing machine, and then approached and made another at much shorter range. Upon preparing to expose a third plate with the camera nearer still, the sun came out in a bright warm gleam and up went the wings of the small tortoiseshell. In another moment it would have been up and off to join its companions in an aerial waltz had not my brother, noticing the change in its demeanour, gently pushed his head forward so as to intercept the sun's rays and throw the insect into shadow. The effect was instantaneous; down went the wings from the vertical to the horizontal and the butterfly became quiescent. We made one or two more studies, and then some experiments upon its behaviour under shadow and sunshine. Directly my brother moved his head on one side up went the wings, but when it was again placed in the shade the insect evidently thought that the life-giving gleam had ended and quietly dropped them. We tried others with precisely similar results, and yet when I have watched them to their sleeping quarters in the evening, behind pieces of dislodged bark and old boards, I have always found them with wings erect.

We tried over and over again to make a picture of a common white butterfly in my garden, by

focussing some favourite flower and then waiting, but there is a tantalising perverseness about the creatures which prevents them from visiting any flower upon which the recording eye of a camera is fixed.

WHITE BUTTERFLY.

As the vivacity of most insects is measurable by the prevailing temperature, we tried again one day in the early part of summer when the thermometer was low and intermittent bursts of sunshine cheated a few butterflies forth, and we succeeded in making the photograph reproduced on this page whilst the creature rested on a turnip leaf.

One great point which must be observed in photographing insects is to make quite sure that they are perfectly still, and that the object upon which they are resting is not being swayed to and fro by the wind.

MEADOW-BROWNS.

Of course, it is quite possible to focus a flower or other object which is much frequented by winged insects and secure a photograph by a little patient waiting. Whilst wandering along a Hertfordshire lane one hot morning last July we were astonished to see meadow brown butterflies dancing hither and thither in every direction. I counted over a dozen upon some thistles which were growing so close to each other that they might have been covered with an ordinary handkerchief, and my brother fixed up his camera and took the accompanying photograph of one of the flowers and its visitors. I noticed that many of the butterflies had their wings so worn and frayed that their progress through the air was distinctly weaker

and slower than that of their better equipped relatives.

Although the majority of butterflies creep into holes, behind pieces of detached bark, under the

ORANGE TIP BUTTERFLY.

roofs of buildings and similar places, to spend the night, some of them, especially the smaller species, simply hang on to flowers, grass stems, and similar objects in the fields.

One evening in May, whilst rambling along a hedgerow side in search of anything interesting I could find, I discovered an orange tip butterfly asleep on a wild flower. Later on we tried to photograph it by means of the magnesium flash-lamp, but as our bull's-eye lantern could not be coaxed

into emitting sufficient light to focus by, we burnt some magnesium ribbon in order to accomplish our end. This presented an unforeseen difficulty. Directly the bright white light flashed out the butterfly became full of animation, spread out its antennæ to right and left, danced about and leant over on one side as if it were under the impression that the light was giving forth some vitalising warmth, whereas it was much too far away for the insect to derive the least benefit of that kind from it.

GRASS MOTH AT "SUGAR."

After a good deal of trouble we succeeded in focussing the insect near the part of the flower where I originally found it, and made a negative from which the picture on the previous page has been reproduced.

Curiously enough upon trying to focus a small dragon-fly by the light from a bit of magnesium

ribbon its behaviour was precisely similar to that of the orange tip.

During the summer months great sport may be enjoyed, and good pictures obtained by "sugaring"

STAG BEETLES.

for moths. This consists of going forth just before dusk into a wood, spinney, or field with a fair amount of timber in it, and smearing the tree-trunks about four feet from the ground with a mixture of treacle, rum, and essence of jargonelle pears, which may be bought ready for use at any naturalist's shop, or prepared by mixing the

ingredients in the following proportions: a quarter of a pound of common treacle, half a quartern of rum, and six drops of essence. Some entomologists prepare their "sugar" by mixing the following: a quarter of a pound of treacle, one gill of ale or porter, one quartern of rum, and one pound of coarse brown sugar, which they heat to boiling-point. A warm, cloudy evening, with the wind in the south or the west, is the best. As soon as we have done smearing, we walk round with our bull's-eye lantern, camera, and flash-lamp, and photograph any moths we may find hard at it, sucking up the decoction through their long spiral trunks. It is absolutely necessary to see that the moth which is being photographed is not, in the exuberance of its joy at having found such a treat, vibrating its wings rapidly at the moment the plate is exposed.

It may be well to warn the student against some of the unaccountable disappointments which are likely to beset his path in this kind of work. My brother and I have sometimes gone out on evenings that appeared, according to all human calculations, eminently suitable, and after "sugaring" thirty or forty trees in a wide circle have not seen a single moth. On the other hand, we have seen crowds running about the trunks of trees which we had "sugared" several nights before.

Earwigs, beetles, and woodlice are almost, if not quite, as fond of "sugar" as moths, and occasionally

when we have hardly been able to find a single specimen of the last-named, we have encountered a beetle of some species or other on nearly every tree. The accompanying illustration of a *Carabus intricatus*—which is, I believe, not a very common

CARABUS INTRICATUS.

species in this country—was photographed near Elstree, in Hertfordshire.

Stag beetles are said to confine their habitat to the southern side of the Thames; we have met them occasionally whilst walking along the lanes of Surrey. The picture on p. 143 represents a male and female.

Sometimes moths that cannot be attracted by

ERMINE MOTH.

"sugar" may be met with, but they are very difficult to photograph on account of their constant and rapid movements. One night, after an unsuccessful turn at "sugaring," I was getting over a field gate on my way home, with a bull's-eye in one hand and the "sugar" pot and brush in the other, when I noticed something white fly against the gate-post, close to my right hand, in which I held the lantern, and drop to the ground. Upon searching I found an ermine moth, and placed it on the leaf of a chestnut tree growing close by. Whether it had been attracted by the light I carried and stunned itself in colliding with the post I cannot say, but we were astonished

to see it remain upon the leaf, where I had placed it, for several minutes, during which our photographer made the study on the opposite page.

One evening, whilst out after pictures of moths, we fell in with a glow-worm upon a hedge-bank, and my brother essayed to photograph it by its own phosphorescent light, but failed to accomplish this novel end on account of his inability to focus, and from the insect's movements. The light which it gave off the nether side of its hind-quarters, however, was so bright that I could distinctly see it shining across the legs of our tripod three feet away. It evidently serves to attract the males of the species, for we saw four close round the female figured below.

GLOW-WORM.

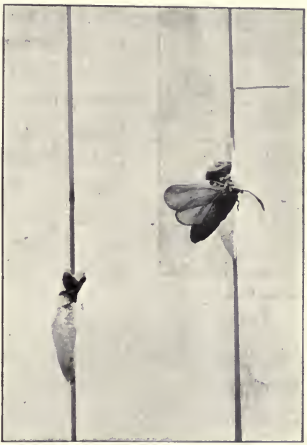
Whilst engaged in taking photographs with a flash-lamp we have on several occasions unwittingly convinced country people who have seen our momentary illuminations that Nature was indulging in a display of summer lightning.

One night an uncommonly inquisitive boy, in front of whose cottage we were photographing, would persist in a very close examination of the different items of our plant, and as in doing so he kicked the leg of the tripod and nearly knocked the camera over

my brother conceived a notion of getting rid of him. He charged his lamp with powder and spirits, and, lighting the latter, looked very serious whilst he pointed out a supposed defect in it, and expressed a fear that it would one day explode and blow both our heads off. "Yes," said I in apprehensive tones; "be careful; two men nearly lost their lives by a flash-lamp accident only last week." The lad looked a bit scared, but didn't budge an inch until my brother suddenly flashed off the lamp, and gave vent to a most agonising howl. There was an immediate clatter across the road, and a big bump against the wooden fence in front of the house where the boy lived. The great blaze of bright light had plunged the troublesome intruder into pitch darkness for a minute or two, and he could not see the gateway to his home. The remedy, however, was effectual, and he did not give us any further trouble that night.

Such moths as burnets and magpies may be photographed by daylight without a great deal of trouble. The six-spot burnet is very common in Caterham Valley, where we now live, and my brother succeeded last August in making the accompanying study of one in the act of emerging from the pupa-case. Magpie or currant moths swarm in Hertfordshire, and by going along the leeside of a hedge on a breezy day and tapping the bushes with a walking-stick, I have disturbed great numbers. When they alight after being disturbed, they generally

do so out of view of the camera, but now and again one will dispose itself advantageously for picture-making. Of course, the less wind the better for successfully photographing the insects.



SIX-SPOT BURNET EMERGING FROM PUPA CASE.

Caterpillars afford a wide field to the photographer, and may be studied with a great deal of ease. The illustrations upon the next page of a gregarious species and its nest represent common objects along almost any hedgeside in the month of June.

Some of the smaller species of dragon flies, found plentifully round water holes, ponds, and near rivers, are quite easy to approach with the camera, and

CATERPILLAR.

remain perfectly still for any length of time. The large ones, whose bodies measure about three inches in length, and whose wings expand until they are nearly four inches from tip to tip, are exceedingly difficult to come near, excepting in the morning and evening, when their alertness and activity are at their lowest ebb. The one figured in our illustration was photographed during a bright afternoon under the most adverse conditions. We noticed that after hawking backwards and forwards across a cattle pond, wherein it had no doubt been bred, it alighted on a particular tall grass stem. My brother

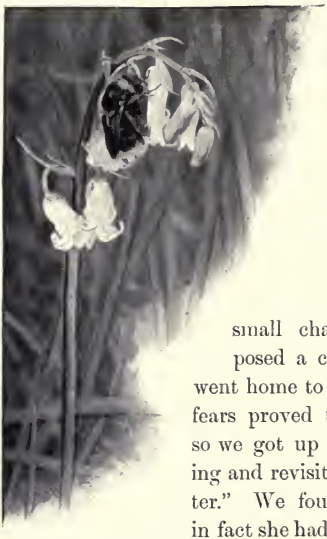
CATERPILLARS' NEST.

waded in and, focussing the insect's point of rest, put a plate in and waited. After a good while the dragon fly condescended to come back, but even its slight weight bent the slender grass stem sufficiently to render it out of focus. We recognised that it was a difficult subject to overcome; but we have rather a liking for that kind of photography, and ultimately succeeded by a little calculation and patience in attaining our object.

DRAGON FLY.

During the absence of my brother I got over the difficulty of making pictures of butterflies and other winged insects by observing places they frequented, and removing every flower but one within a given area, then cutting a model butterfly out of a piece of newspaper, sticking it on the flower and obtaining a good clear focus by means of the type.

Humble bees may sometimes be photographed whilst asleep on a flower. On the 16th of last May we found one hanging to a blue-bell in a field



BEE ON BLUE-BELL.

about a mile away from our home. It was late in the evening, and, as the light was very poor, we had little faith in securing anything like a good picture. However, it does not pay to neglect even small chances, and we exposed a couple of plates, and went home to develop them. Our fears proved to be well founded, so we got up at 4.30 next morning and revisited our winged "sitter." We found her still asleep, in fact she had not stirred a hair's-breadth from where we left her. After making two studies I took her off the flower and placed her in the palm of my hand. She seemed to resent such an unwarrantable interference with her rest, but was too sleepy to punish me for my pains by a taste of her sting.

Wasps are extremely interesting, but vicious little insects when angered. Curiously enough, whilst living at my old home in the north of England I used to find their nests suspended from currant bushes, rocks, and overhanging banks, as represented

in our illustration; but during a sixteen years' residence in the south the reverse has always been the case, and I have met with by far the greater number in holes in the ground. I once found a small wasp's nest inside an old one belonging to a common wren.

WASP'S NEST.

Wasps kill great numbers of other insects. I have seen them come into the kitchen of an old Surrey farmhouse and snatch house-flies off the heads of nails protruding from a beam as dexterously as a professional cricketer would catch a ball; and after they had torn the wings of their victims off they flew through the open window and away

Nothing seems to come amiss to them in the eating line. I had a hive of honey bees moved a few months ago, and a number of robbers of the same species, scenting the exposed honey, made an onslaught, and there was a great battle, resulting in a heap of slain invaders being thrown outside. Several wasps discovered the bodies of the dead marauders, and, cutting them in two at the narrow part joining the abdomen to the thorax, ate the contents of the former. One morning I saw a dead young bee thrown out of the hive. It had not lain more than a minute or two before a wasp came along and seized it. He tried to fly away with it, but finding the piece of carrion too heavy to lift, he at once set to work, and, severing the thorax and head from the abdomen, flew away with the latter.

They are also cannibals. One day I watched one cut the head clean off an injured comrade and fly away with it.

Wasps are also great drunkards, and when fallen fruit begins to rot and ferment they are at the very height of their enjoyment. I have seen them suck up the juice from a hole in the side of a rotting pear until they fell over helpless in the grass. It it said on good authority that they lie in this state until they become sober, and then go straight back again to another carouse.

They are gifted with great vitality. I recently killed an adder and left him for an hour or two before I examined the contents of his stomach. When

I did so I found a full-grown mouse and a wasp which was very much alive.

More attention has probably been paid to ants and their ways than to any other insects, mainly on

SNAILS.

account of their highly developed intelligence and the communistic principles upon which they live. I have had a number under observation, but must say that I have been disappointed in not discovering greater displays of intelligence in them. I placed a good portion of a colony in a large glass

jar with plenty of earth, and then stood the whole in a big bowl of water. On several occasions when I removed the covering of the jar to feed the insects I purposely left it off, and watched to see what would happen. Numbers fell over into the water through trying to escape. These I put back again, thinking they would communicate the danger to their comrades and thus prevent any more immersions. They either failed to do so or their warnings were unheeded, for adventurous spirits still continued to explore and fall over into the moat. I tried them over and over again at intervals of a day or two, but always with the same result.

They are excellent scavengers, and anyone desirous of having a bird's egg that cannot be blown cleaned out has nothing to do but bury it in an ant-hill for a couple of days. I have buried dead birds, the skeletons of which I required, in a small cardboard box, perforated along the sides, and a day or two afterwards there has not been a particle of flesh left.

I have seen an ant carry a piece of cake twice its size, and in all probability also twice its own weight, up a steep bank side, and the patience and ingenuity the little creature displayed in surmounting different obstacles along its path were truly marvellous.

Once upon a time, as the story-books put it, some aristocratic French exile living amongst the Surrey hills pined for a dish of edible snails. A

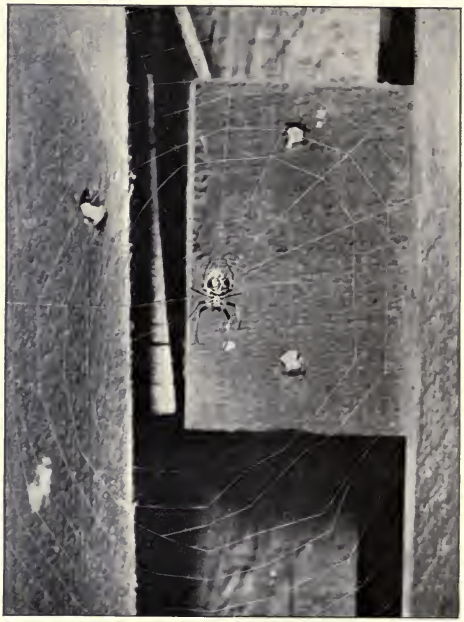
stock was accordingly brought over from the Continent and turned down within an enclosure, to be drawn upon when required. Some of these escaped and bred, and the illustration on page 155 represents one of their descendants photographed beside one of the common banded snails.

This is how some of the natives of Caterham Valley account for their presence; but as the Romans were very fond of edible snails, and introduced fallow deer and one or two other creatures to this country, it is possible they brought them from the Continent, or they may be, as some people claim, indigenous to our dry chalky hills.

The great black slug is looked upon as a weather prophet in the Yorkshire dales, and if it is out in numbers during the evening or early in the morning, a wet day is said to be likely to follow. A curious fact about this particular species is that it is very fond of tobacco, for which it will at any time leave all other kinds of food.

To anyone who wishes to know how a spider builds his web I would recommend a walk almost any fine still night with a bull's-eye lantern, alongside a hedgerow or dry stone wall. I have watched some of the finest webs imaginable being woven, and the dexterity and rapidity with which the work is done are extraordinary. Those spreading large fly-nets across the openings between wooden palings and other places where a current of air is likely to sweep winged victims into them, have the guide-

lines fixed first, and then the circular ones worked in from the outer edges. They generally do the



SPIDER AND WEB (PHOTOGRAPHED BY FLASHLIGHT).

work from the outside, and as soon as they have completed their task retire inside and wait in the centre for their prey. As an instance of the deadly nature of some of these nets, I counted no fewer

than 185 flies in one of average size made in the corner of a doorway upon one occasion.

SPIDER AND WEB ON A ROSE-TREE.

Of course different species build different kinds of nets and traps, and the great strength of many of them is surprising.

Some spiders simply rush up and seize their

prey directly it becomes entangled, especially when the victim is of small size. I saw the one figured on page 158 do this with a fly, which he unceremoniously dragged right through his web and straightway devoured. Others, when they entangle a large fly, bind it securely before they commence

GRASSHOPPER.

to despatch it. I once watched a blue-bottle enmesh itself in a spider's web. The owner was waiting at the end of his tunnel of retreat, and directly the poor fly began to struggle it telegraphed the news of its predicament down along the threads of the web, and out rushed the spider in response. There was a very brief encounter, and the blue-bottle began to revolve like a spitted ox before a fire, and turn greyer and greyer. At every turn the spider

was binding it with an additional thread, and when the victim was secured beyond all possible chance of escape the captor quietly set to and drank its blood.

Spiders and their webs are easy to photograph on calm days and nights, and the latter look particularly well when covered with hoar frost.

The Surrey hills swarm with grasshoppers of every size and hue. They are, as may be guessed, however, extremely difficult subjects to photograph. I succeeded in making the study on page 160, which has been enlarged, upon a much-frequented grass-bank after half a day's careful stalking and repeated attempts.

A QUIET CORNER OF MIDDLESEX.

CHAPTER VII.

BITS BY POND, RIVER, AND SEASHORE.

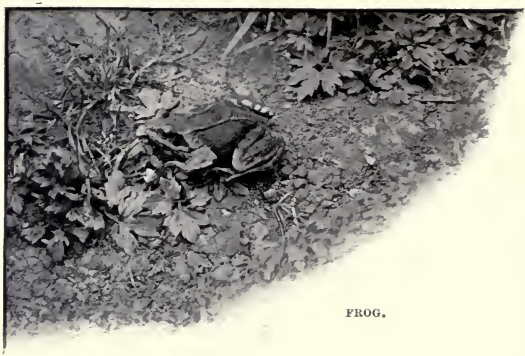
This chapter deals with three wide fields all teeming with life; and therefore only the commonest of creatures, and such as lend themselves to portrayal by means of the camera, can claim our attention within its pages.

Newts, or efts as they are called in some parts of the country, are common in most ponds, and seem to be in possession of extremely shrewd notions of how to take care of themselves. I watched a couple ascend a little creek on the side of a cattle pond one day in search of something to eat, and stealing quietly up behind them barred their way out, and being an old hand at trout tickling, soon caught the pair and put them into an empty lemonade bottle which I found close by and filled with water. I stood it up in a cow's hoof-hole for a few minutes whilst I went in search of a worm or two wherewith to render my captives happy in their new quarters; but when I came back one of them had regained the pond, and the other arrived so near it that he beat me in the race and swam away before I could lay hands on him. It is amusing to sit and

watch these little creatures rise and take a fly and quickly dive to the bottom of their native pond with it. I have no doubt but that in fairly clear water a photograph could be obtained of them in the act of seizing their prey.

GOLD FISH.

More as an illustration of what may be done with a camera in this way, than for its appropriateness from a natural history point of view, I have had the accompanying photograph reproduced. It represents a number of gold fish swimming in a pond upon which a handful of crumbs was thrown to attract them to the surface. The picture was made from the top of a little stone bridge.



FROG.

Frogs are common enough almost everywhere, and are extremely easy to study and photograph. I once kept one as a pet in a little suburban garden, and we became great friends. I used to feed him with flies and worms until he would almost take them from my hand. He used to examine my contributions to his dietary for a few seconds in a wise sort of way, and then, darting out his long tongue with the quickness of a flash of lightning, literally pitch the food down his throat. I do not believe it is generally known that a frog's tongue is differently hung to that of nearly every other living creature. It is attached to the front part of the under jaw, and when at rest points down the animal's gullet.

My tame friend was very fond of bluebottle flies, but I could never get him to tackle a wasp under

any circumstances although I tried him over and over again.

Frogs cry out most pitifully when they have good reason to fear harm is coming to them. I have often known them to do this when trying to escape from the murderous swish of a mower's scythe. One morning I heard my pet give mouth, and knowing that there must be mischief in the air, rushed out to see what was the matter. A great grey cat had seized the frog, but immediately dropped him at the instigation of a flying broom. The little chap was both injured and scared, so

TADPOLES.

immediately sought shelter in a favourite bit of rockery where he usually retired in hot weather. He

recovered, but I regret to say the cat ultimately succeeded in killing him.

I have measured an adult frog's leap on level ground and found it to be twenty-three inches in length, but it is said to be capable of much more.

Frogs love a hole filled with peat-moss water better than any other kind of situation to breed in, and I have seen quite a large place of this kind literally black with tadpoles during the month of June. Here, earlier in the spring, their weird croaking may be heard to perfection. I have many, many times sat on a boulder, away up on a lonely Yorkshire moor, far from any human haunts or sound, and listened to an almost unbroken chorus coming from a brown slime-covered pool close by until the whole place began to feel eerie and uncanny.

Some people are incapable of distinguishing frog music from that of a turtle dove. I was sitting on a roadside rail one summer's evening watching a water vole in a pond not far from Elstree, when three London cyclists rode by. One of them heard a turtle dove calling in a hedge close at hand, and called out, "Bill, do you hear that frog a-croakin'?" His friend was in the act of expressing some measure of surprise when his wheels carried him out of earshot.

Toads are not nearly so common as frogs, and although somewhat similar in size and appearance, they may be easily distinguished from the latter by their warty skins, and their crawling method of

progression instead of leaping. I remember how very frightened I used to be of the poor innocent creatures when I was a boy, labouring under the belief that what some of the old country folks said about their venomous qualities was true.

TOAD.

A member of the species sat all last winter under a big tuft of grass in my garden. He had worked such a hole for himself in the mould that his back was on a level with the ground. An errand boy belonging to a general store discovered him one day when delivering goods, and afterwards harassed the poor thing by all sorts of unwelcome attentions until he was obliged to desert his shelter probably long before he intended to do so. I thought I had quite lost my toad until one night,

weeks after we had missed him, he walked into a room where I was sitting writing and came quite sedately up on to a hearthrug close to my feet.

Trout have many interesting little habits that even the man who tries to deceive them with an artificial fly does not know much about. Those living in shallow, rapid streams come right out to the very edges in search of larvæ during summer nights, and as the light from a bull's-eye lantern fills them with a kind of staring curiosity they can be photographed by the aid of a flash-lamp. I have often seen them searching for food in water so shallow that their backs were not covered. Owls and cats occasionally profit by a discovery of this nocturnal boldness.

In the autumn trout begin to ascend rivers and brooks in order to get to their breeding quarters in small sluggish streams with sandy bottoms if possible, and upon their journey encounter such obstacles as weirs and waterfalls, which they may be seen leaping almost every minute for days together, thus affording an opportunity for any enterprising camera man. Artificial light exercises almost as great a fascination over trout as it does over moths. I have, when helping experimentalists in pisciculture, put a small hand net down in the bottom of little streams which I could easily stride across anywhere, and then attracted such a crowd of wondering fish over it with the rays from a bull's-eye that I caught three or four at a time by

quietly lifting up the net. They will travel through long dark drains to their spawning grounds, and their instinctive knowledge of suitable streams is just as marvellous as that which guides migratory birds to and from their winter quarters. For instance, a mountain trout will travel several hundred yards up a small stream which is nothing but rough

LIZARD.

boulders and falls, in order to avail himself of a hundred yards or two of sluggish water with a sandy bottom, in spite of the fact that he had, if bred in it, probably not been back for several years since quitting its waters. Again, they do not ascend unsuitable streams in any numbers for breeding purposes, even if the volume of water be twice that of a suitable one.

After depositing their spawn they descend to their old haunts again in a very weak, lethargic condition. I have seen one through the ice covering

a Yorkshire beck for days together in exactly the same situation.

Although, perhaps, not quite appropriate, I think it will be best to deal with the common lizard in this the concluding chapter, as the reptile is sure to be met with by the natural history photographer during his wanderings. He is a difficult little chap to make a picture of, however, and an assistant will generally have to be requisitioned before he can be persuaded to "sit" long enough in one attitude. We have lots of lizards on the Surrey hills, and although some of the natural history books say that the reptile is partial to winged insects as food, our observations go to prove that it is fonder of small earthworms.

We have tried several times to photograph a whale when the animal came to the surface of the sea to breathe, but, unfortunately, have never succeeded in securing a picture. My first acquaintance with the leviathan was made whilst lying on my back in a smack's boat one dark night beyond the Dogger Bank. I was unable to sleep on account of the rolling and pitching of the craft, and the fact that I was nearly frozen, having nothing to cover me in the way of bed-clothes except an old sail, when I became suddenly aware of strange unearthly sounds in the sea around me. I listened for a long while to a loud wheezing, sighing kind of breathing, without being in the least able to conjecture whence it proceeded, when I put my head out and

STRIPPING WHALE.

inquired from the man on watch. "A school of herring with the bottle-noses busy among 'em, sir," was the reply. In the morning we saw plenty of the whales, and most of them were working in pairs and moving with the precision of well-trained carriage horses.

I have since seen whales dead or alive in many places round the British Isles, but only once saw one spout and that was off Flamborough Head. I must confess that I was a little bit disappointed with his column of spray, too, because picture-books had given me rather exalted ideas of the performance.

Whilst we were in the Shetlands last summer a Norwegian fishing boat towed a dead bottle-nose into Balta Sound. We heard the crew were going to beach it very early one morning in order to strip the blubber, so got up at 3 a.m. and went down to photograph it on the foreshore, and although dead animals do not come within the scope of this work I venture to reproduce the picture. The carcase of another whale of the same species was washed ashore on another part of the islands, and as its head was injured the natives conjectured that there had been a battle-royal.

I have seen the dorsal fin of a shark two or three times in British waters, but, of course, such a limited portion of the fish would not be worth photographing.

I know one or two amateur photographers who

have succeeded in making studies of seals on rocks and even in the very act of precipitating themselves into the sea; but although my brother and I have tried hard on several occasions we have never had any luck. We have, however, by waiting and watching sometimes for five hours at a stretch, discovered a fact which it is useful to know—namely, that it is next to useless to lie up and wait for the animals to return to a basking rock from which they have been scared.

Four species of seals are met with in British waters, and their calves are easily captured on such rocks as the Hiaskers in the Hebrides, and the Out Skerries in the Shetlands. It is said that the animals are partial to the strains of the bagpipes. They are very curious, and when a quiet piece of water which they haunt is visited they keep on popping up and staring with their great dark mild eyes. A gunner in the Shetlands told us that he never thought of shooting at a seal unless the back of the animal's head were towards him, and its eyes consequently averted, because if he did it would be sure to see the flash of his rifle, and go down long before the bullet reached it.

A man armed with a telephoto lens would be able to make pictures of seals basking on rocks.

Apart from its birds and beasts the seashore teems with all sorts of subjects full of interest to the student of Nature, and well worthy the attention of the camera man from a picture point of view.

Crabs may be found in numbers in almost all rock pools, and are so abundant on some parts of our coast as to preclude all chance of line fishing. Directly a baited hook drops to the bottom of the sea they concentrate their attention upon it and in a minute or two there is nothing left but a bit of bare unattractive steel. They are

LOBSTER.

very difficult to photograph under water, however clear and shallow.

I have occasionally met with a lobster in a rock pool, but never saw one, however scared, voluntarily cast off any of its limbs, as we are led to believe they do in some natural history works. We tried hard to figure the accompanying specimen under water at the Farne Islands last year, but did not succeed in making a negative

which we considered good enough to reproduce from, so have used one taken of the crustacean whilst it was on a piece of bare rock close to the water's edge.

We have had a good many tries at photo-

SEA ANEMONES.

graphing objects under water but have never succeeded in making a picture worth boasting about. The accompanying one of sea anemones was made in the Shetland Islands by the aid of a looking-glass with which I strengthened the light upon the pool wherein the creatures lived. Although they look like anchored flowers upon their native rocks they are quite capable of travelling, and I

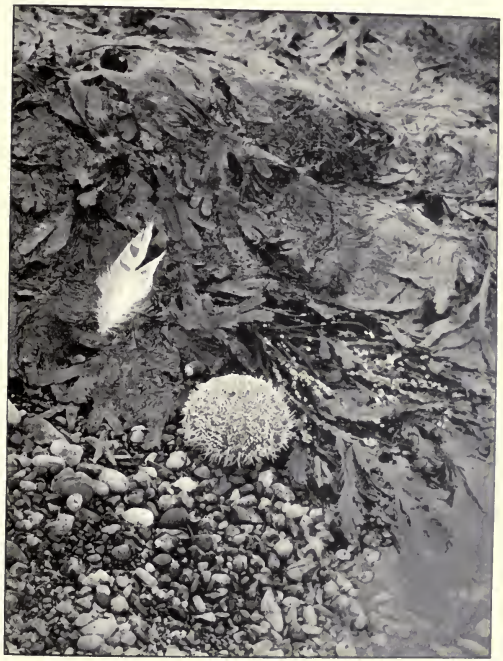
have seen one little bigger than a pea quietly marching up the red side of a relative ten times its size. I have also noticed that they will move to different parts of a stone during a single day.

Starfish of all sizes are common enough on most of our beaches, especially where there is sand and shingle, and are, of course, easy enough to photograph. They exist in such vast numbers in some parts of the sea that it is quite useless for fishermen to lay down lines, because the bait is all sucked off the hooks long before the fish it is desired to catch have a chance of finding it. Many people think that all starfish found upon the beach are dead, but this is by no means the case. Those that are rigid and firm to the touch are alive, although they are unable to show it by skipping about like sand fleas.

Sea urchins, or sea eggs, may sometimes be fished up out of the water, in which case they are, unlike those thrown up by the waves, in possession of their peculiar spines which give them a resemblance to hedgehogs, hence the name of urchin. The illustration upon the opposite page represents a sea urchin and small starfish just where we found them on the shores of a Shetland Voe much frequented by gulls.

On some shores mussels are to be met with literally in millions. Whilst on the eastern side of the Noup of Noss last summer I noticed that every particle of rock, from high-water mark down to the

utmost limit to which the eye could pierce through the clear water, everything was black with them,



SEA URCHIN AND STARFISH.

and not one of the bivalves was, so far as I could see, more than half an inch in length. Mussels anchor themselves to the piece of rock or wood

upon which they live by a number of brown silken threads of great strength. I found one some time ago an inch in length attached to a stone, and, with a view to testing the stability of its anchor chains, secured a spring balance, and tying a piece of string round the mussel suspended the whole. The stone weighed two pounds, and weight was added up to four before the silken threads gave way. Even then it must be borne in mind that, owing to the peculiar shape of the object I had to attach my string to, equal strain could not be placed upon each thread at the same moment.

The illustration on the next page, of a typical bit of beach at the head of a Shetland Voe, shows cockle shells both full and empty, a worm casting, and other signs of life and death. Some popular books of natural history say that the cockle when lifted out of its home in the sand has the power to bury itself again or shift to new quarters, but the Scottish Fishery Board does not entirely endorse these views. Some years ago the fishermen of Mid Yell used to rake the sand at the head of the Voe, take what cockles they required for bait, and leave the rest, which, instead of burying themselves, died upon the sand; and this deplorable waste went on until bait for line fishing at sea became so scarce that the authorities had to step in and regulate the destructive method of dealing with it.

Periwinkles, limpets, and other mollusca abound on rocky shores, and although at first sight

they appear to be as stationary as the crags upon which they live, it is surprising what an amount of wandering about some of them really do. I once had some rocks under observation for a week, and was astonished at the way in which a number of purpura shifted from place to place. One day a

SHELLS ON SEASHORE.

rock would be covered with them, as seen in our illustration on page 181, and the next hardly a single specimen could be seen upon it.

The large shells in that illustration are popularly called dog periwinkles, or purple shells; the latter name refers to a purple dye that may be obtained from them. This was formerly used in manufactures, but the difficulty of collecting it in sufficient quantities has caused its use to be abandoned.

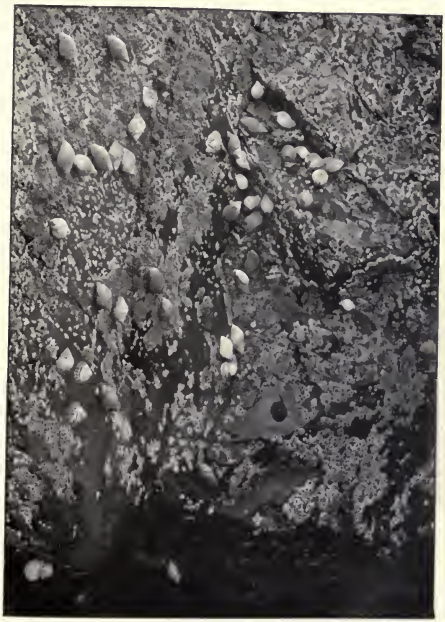
It is interesting to watch a periwinkle feeding upon a piece of seaweed, and in doing so the observer is irresistibly reminded of its similarity to a common land snail. Although the former can live out of the sea, for a limited time at any rate, and travel over rocks that are out of the water, the latter cannot live in salt water. On the sandy beach near Bamborough Castle the high-water mark is indicated by a line of beautifully coloured snail shells.

Limpets sometimes live above high-water mark, but for how long it is difficult to say. However, I have seen them there a sufficient length of time to prove that they can manage to exist without being washed by the sea twice a day.

It has recently been stated that all eels are bred in the sea, and that they exactly reverse the migratory breeding movements of the salmon; but how their young ones, when only five or six inches long and as thick as the stem of a churchwarden clay pipe, travel up a hundred and fifty miles of river, and surmount such obstacles as waterfalls that tax the best leaping energies of a trout, I cannot conceive. We used to have a few eels away up in the dale becks of Yorkshire, where I have "guddled" them two pounds in weight when a boy and I always thought when I saw young ones playing about on a sandbank that they had been bred there.

Probably the very commonest creatures to be met with between the tide marks of any rocky

shore are barnacles. They cover stones and woodwork and ironwork; and when once they have



BARNACLES AND PURPLE SHELLS ON ROCKS.

established themselves, it is not long before shell joins shell, and fresh settlers arrive to extend the limits of the colony. Not unnaturally many visitors to the seaside consider them to be

relations of the oyster and the mussel; they are, however, cousins of the crab and the shrimp. They also enjoy the popular name of acorn shells, and although they do not appear to be very interesting when they have no water covering them, the very reverse is the case directly the tide flow immerses their shells. I remember my astonishment upon first discovering two or three of the little creatures on the feed in a small rock pool. They threw out what appeared to be tiny casting nets from the holes in the crown of their conical houses. After making a few waving sweeps backwards and forwards, these expanded nets suddenly contracted, like midget hands grasping some invisible prize, and disappeared. They did not remain out of sight for long, however, but came forth and were soon hard at work again.

ACORN BARNACLES ON MUSSEL.

Acorn shells will affix themselves to almost anything. I have seen limpets covered with them, and the accompanying illustration of half a mussel shell shows two or three empty houses belonging to the species.

In bringing the last chapter of this little work

to a close I feel that I have only touched the fringe of a great and fascinating subject, yet I hope that my brother and I may have achieved sufficient to send young men and maidens out into the fields with cameras to study the wild life of this and other lands for themselves. If they go and work with care and patience I am quite sure they will add greatly to their own store of knowledge and health, and in all probability obtian many interesting facts and authentic pictures for the benefit and pleasure of mankind at large. In any case they will always have our sympathy and, when they ask it, our best advice.

FISHING BOATS PHOTOGRAPHED AT MIDNIGHT IN THE SHETLANDS.

INDEX

Accident, An amusing, 40
——, A photograph lost by a curious, 116
——, Curious, to a mouse, 132
Accidents wild animals are liable to, 121
Advice, Final words of, 183
Ailsa Craig and its cragsman, 99
Ammonia as a cat scarer, 59
——, Effect of sniffing, 60
Amusing incident in connection with a telephoto lens, 7
Anchor threads of mussel, 177
Anemones photographed under water, 175
Animals, Difficulties of photographing, 4
Ants as porters, 156
—— as scavengers, 156
—— and their ways, 155
Apparatus needed for taking photographs by flashlight, 8
Artificial rubbish-heap, How to make and use for hiding in, 15
—— tree-trunk, How to make and use for hiding purposes, 10

Badgers near London, 121
Bagpipes and seals, 173
Barnacles and their kinsfolk, 181
——, How they catch their food, 182
Bass Rock, and how to get on to it, 98
Bats, 133
Bees, Humble, asleep, 151
Beetles, How a mole caught, 130
——, Stag, and their habitat, 145
—— and "sugar," 144
Benefits of early rising, 47
Birds, A list of, for town dwellers to study and photograph, 94
——, Courtship of, 52
——, Best time for studying and photographing, 46
—— flying, Photographing, 3
——, How they feed all their young alike, 88
——, —— —— keep their chicks dry, 72
——, How to induce them to build in odd situations, 57
Birds' nesting, Glorious uncertainty of, 51
—— nests, How to search for, 47
—— —— in cliffs, how to find them, 20
—— —— —— photographed without assistance of ropes, 34
Birds, Secret of getting close to, 37
—— that attack human beings, 107
—— —— betray their nests, 52
—— —— can be photographed on the wing, 98
Biscuit-box, Robin's nest in a, 60
Blackbird, A pied, and her nest, 66
Boats, Photographing from, 44
Boy, Frightening a too inquisitive, 147
Butterflies, A crowd of meadow-brown, 140
——, Photographing, 136
——, where they sleep, 141
Butterfly, Curious effect of flashlight on, 142
——, How we photographed a white, 139
——, Orange tip, photographed by flashlight, 141
——, Photographing a small tortoiseshell, 136

Camera, Advice in regard to buying a, 2
——, Description of our, 2
——, Hand, 34
——, How to hide, in winter, 94
——, How to use, down a cliff, 33
——, Miniature, and its uses, 44
——, Pictures obtained by a guinea, 2
——, Price of, 1
Cannibal wasps, 154
Catching moles alive, 129
Caterpillars, 149
Cats as the enemies of birds, 56-60
Cattle, Wild, 134
Chaffinches, Our unsuccessful attempts to photograph, 82
Cliff climbers, Signals used by, 31
—— climbing exhilarating work, 30
—— —— without ropes, Dangers of, 38
—— descending, Dangers of, 30
—— —— good preliminary practice, 26
—— ——, important precautionary measures, 26
——, How to descend, 23
—— photography, The kind of men to assist in, 23
—— photography without ropes, 34
——, The right way to descend, 26
——, The wrong way to descend, 25
—— work and windy weather, 34
Cliffs, Effects of looking over, on different people, 30

Cliffs, how to find birds' nests in, 20
Cockles and their habits, 178
"Cocks' nests" built by wrens, 91
Courtship of birds, 52
Crabs and baited hooks, 174
——, Difficulty of photographing, under water, 174
Crows, Carrion, abundance of, near London, 69
—— ——, Boldness of, 69
—— ——, Rapacity of, 70
Cubs, Fox, possibility of photographing, 121

Dainties dear to the sea-gull's heart, 105
Dangers of cliff climbing without ropes, 38
—— of cliff descending, 30
Deer Fallow, Red and Roe, 134
——, Possibility of photographing, with telephoto lens, 134
Developing, Hints about, 7
—— materials, Advice about, 5
Dog hanged by a mole, 128
Dragon-flies, Where to find, 149
—— -fly, Curious effect of flashlight on, 143
—— ——, How we photographed a large, 150
Drunken wasps, 154
Duck, Wild, The antics of a, 51
Ducks, Eider, and their tameness, 98

Eagle, White-tailed or Sea, Eyrie of, 28
Earwigs and "sugar," 144
Eels, Breeding habits of, 180
Epping Forest, Deer in, 134
Escape, A hairbreadth, 28
——, A narrow, 99

Farne Islands and the sea-birds breeding on them, 97
Faults to which the amateur photographer is prone, 7
Feathered robbers of the sea, 107
Feeding and photographing young sea-gulls, 104
—— birds in winter, 94
Ferret, Squirrel's horror of a, 127
Field glasses, Advice about, 9
—— work, Advice about, 6
Fish photographed whilst swimming in the water, 163
Fishermen's bait and starfish, 176
Flashlamp, Frightening a too inquisitive boy with a, 147
Flashlight, Curious effect of, on orange tip butterfly, 142
—— mistaken for lightning, 147
—— photography, 8
Fledglings, Photographing, 83
Flies caught by a single spider's web, 159
Focus, How to obtain a good sharp, 6
Focussing cloth, the best kind to use, 5
Food collecting habits of bearded tit, 87
——, How barnacles catch their, 182
——, How birds give all their young, 88
——, Mole's inability to do without, for more than twelve hours, 131
Fox at play, 120
Fox trying to catch a pheasant, 121
Foxes, Young, drowned by accident, 121
Fright, A bad, 37
Frog music, 166
Frog's cry of fear, 165
—— leap, Length of, 166
Frogs and their food, 164
——, Where they love to breed, 166
Fulmar Petrel, breeding in the Shetlands, 111

Gardeners and starlings, 77
Glow-worm and its light, 147
Goats, Wild, 134
Grasshoppers as "sitters," 161
Grief of a great tit, 64
Ground, Squirrels on the, 127
Guide books to photography, 1
Gulls, Immature, in our harbours, 103
—— like to wash in fresh water, 106

Habitat of rats, how it is extended, 123
—— of stag beetles, 145
Habit, Curious, of great skuas, 111
——, Peculiar, of wild cattle, 134
Habits, Curious, of hares, 113
——, Breeding, of eels, 180
——, ——, of salmon, 180
—— of a blackbird, 68
—— of the cockle, 178
—— of common rat, 122
—— of great tit, 62
—— of starlings and blackbirds compared, 78
—— of trout, 168
—— of water-voles, 123
—— of weasels, 120
Hares and their curious habits, 113
—— —— —— love of old haunts, 114
——, Tricks practised by, 114
Haunts, the love of hares for old, 114
Hebrides, and where to work them from, 100
Hedgehogs. 127
Hedges, high, How to photograph nests in, 42
Hedge-sparrow, Habits of, 54
——, nest building, 54
Hiding contrivances, 10-17
—— up for shy animals, 9
Hints, A few general, 17

Important points, 1
Industry of male chaffinches, 83
—— of starlings, 78
Insects, A method of photographing, 151
——, Important point about photographing, 139
——, Photographing, 136
Instinct *versus* reason, 26
Instinctive movements of worms, 128
Instincts of trout, 169
Intelligence of ants, 155

Kittiwakes, Photographing, on their nests, 103

Larder, A weasel's, 120
"Leather-jackets" destroyed by starlings, 76
Lens, Importance of buying a good, 2
——, Telephoto, and its uses, 7
——, ——, Possibility of photographing deer with, 134
——, ——, Possibility of photographing horses with, 116
——, ——, and seals, 173
Leverets, Photographing a pair of, 116
Light emitted by glow-worm, 147
Limpets above high water mark, 180
Lizards as "sitters," 170
Lobster, Attempts to photograph, under water, 174
London, The birds of, 56
Love-making of hares, 113

Mammals, British, 113
Men to assist in cliff work, 23
Mice, Nests of, 132
——, their cunning and timidity, 131
Mole, How a, caught beetles, 130
Moles, Great strength of, 128
——, How to catch alive, 129
——, Inability to do without food for more than twelve hours, 131
——, When they come to the surface of the ground, 129
Mollusca on rocky shores, 178
——, Wandering habits of, 179
Moorhen, Curious noise made by a, 71
Moorhens, How I caught a number of young, 70
——, How they hide their nests, 70
Moth, Ermine, 146
Moths, "Sugaring" for, 143
——, Suitable nights for "sugaring" for, 144
—— that may be photographed by daylight 148
Mourning period of a blackbird, 68
Mouse, A pet, 132
——, How I caught a, 131
Music of frogs, 166
Mussel, Anchor threads of, 177
Mussels in millions, 176

Naturalist, Impression made upon, by great skua, 108
Needle and thread stolen by a wren, 92
Nest, Great Tit's, inside a thrush's, 91
——, Watching a bird build its, 54
Nesting places, Curious, 89
Nests betrayed by male birds, 52
——, Helping birds to build their, 54
——, How moorhens hide their, 70
——, How to search for, 47
—— in high hedges, How to photograph, 42
—— in trees, How to examine interiors of, 41
—— in trees, Photographing, 40
——, "Mock," made by great skuas, 111
—— of game birds, 52
—— of ground-building birds, How to find, 52
—— of harvest mice, 132
—— of predatory birds, 52
Newts caught and lost, 162
Noup of Noss a sea-fowl paradise, 103
Nuts, Squirrels' fondness for 127

Observation, Cultivating powers of, 49
Orkney and Shetland Islands rich in sea-bird life, 100
Otters, Alertness of

Parasites on birds and fish, 106
Periwinkle feeding, 180
Pheasant sitting on her nest whilst her eggs were being stolen by a stoat, 119
—— *versus* fox, 121
Photographing a chaffinch and nest in a dark place, 82
—— a humble bee asleep, 152
—— a pair of Leverets, 116
—— a pied blackbird feeding her young, 68
—— a small tortoiseshell butterfly, 136
—— birds feeding their young, 72
—— common rats, Difficulties of, 122
—— fish in the water, 163
—— fledglings, 83
—— flying birds, 3
—— from boats, 44
—— in cliffs, trees, &c., Necessary qualifications for, 20
—— moving objects, 44
—— nests in trees, 40
—— the photographer at work, 36
—— wild birds at roost, 8
—— with the camera in a coal-scuttle, 105
Piano, Squirrel's love for sounds of a, 125
Plates, the best kinds to use, 6
Play, Rabbits at, 117
Pneumatic tubing and its uses, 4
Preservation, Effect of, on great skuas, 111
Preservers of the great skua, 108
Puffins, The fun of stalking, with a camera, 101
Purple shells, Dye from, 179

Rabbits at play, 117
——, How to attract them, 118
——, How to photograph them, 118
Rat, common, Habits of, 122
——, Old British black, 122
Rats, How their habitat is extended, 123
Reason *versus* instinct, 26
Reed Pheasant, 49
Robin's nest, Accident to a, 58
—— nest in a biscuit-box, 60
—— nest in hand-basket, 89
Rocky Shores, Mollusca upon, 178
Romans as introducers of foreign animals, 157
Rooks' nests, 93
Rope, How to pay out to cliff descender, 31
Ropes, Care of, in descending a cliff, 30
——, Importance of retaining hold of, 32
—— used for descending cliffs, 20
Rubbish-heap, artificial, Advice about using, 16
—— heap, artificial, How to make, for hiding in, 15

Salmon breeding, Habits of, 180
Salt, A child's attempt to catch birds by a pinch of, 94

Sea-birds, and how to stalk them with the camera, 96
—— birds breeding on the Farne Islands, 97
Seals, Waiting in vain for, 173
——, Where they breed in Britain, 173
Shag, Bitten by a, 38
—— Photographing a, 36
Shags, Boldness of, 21
Shag's cry of distress, 37
Sharks in British Waters, 172
Sheep, Wild, 135
Shrike, red-backed, on the defensive, 83
Shrikes, Courtship of, 53
Shutter, Importance of using a silent, 4
——, Very rapid, and its uses, 4
Signals used by cliff climbers, 31
Skua, Great, and its methods of attack, 108
——, ——, and its preservers, 108
——, ——, and where it breeds, 108
——, ——, habit of moving its eggs, 111
——, ——, Speed of flight of, 110
Skuas at Home, 107
——, Great, A protector of, 24
Skylark, Actions of a, 73
——, How we photographed a, feeding her chicks, 73
Sleeping-places of butterflies, 141
Slides, dark, Advice about, 5
Slugs as weather prophets, 157
Snails, Edible, 156
Sparrows, How we photographed, 94
Spiders, How they catch flies, 160
——, How they build their webs, 157
Spiders' webs covered with hoar frost, 161
Squirrel, How we found the nest of a, 124
Squirrel's horror of a ferret, 127
—— love for piano sounds, 125
Squirrels on the ground, 127
Squirrel, young, How we reared a, 125
Starfish and fishermen's bait, 176
——, How to distingnish a live from a dead one, 176
Starlings, How we photographed a pair feeding their young, 75
——, Industry of, 76
Stoat climbing to a blackbird's nest, 119
—— stealing eggs from beneath a sitting pheasant, 119
St. Kilda a grand place for sea-birds, 100
St. Kildans and their love of cliff climbing, 30
Subject, A great and fascinating, 183
"Sugar," How to prepare, for moths, 144
"Sugaring" for moths, 143
——, Suitable nights for, 144
Swift exhausted lighting on fishing-boat at night, 84

Tameness of a long-tailed tit, 80
Things to be remembered, 5
Thrushes, A pair of, and their young, 64
Thrush, How we photographed a, feeding her young, 64
Tit, Bearded, Brooding habits of male, 51
——, ——, How we found the nest of a, 49
—— family a bold one, 78
—— family, Curious nesting places of members of, 90
——, Great, Curious habits of, 62
——, ——, killed on her nest by a cat, 63
——, ——, How we photograpl ed a, 90
——, Nest of a Great, inside a thrush's, 91
Tits, Capturing young Bearded, 86
——, Bearded, as gymnasts, 86
——, Long-tailed, Curious sleeping habits of, 80
——, Long-tailed, How we photographed the, 80
Toads, How to distinguish, from frogs, 166
Toad's winter quarters, 167
Tongue of a frog, 164
Tracks of birds, How we photographed them in the snow, 96
—— of wild creatures in the snow, 94
Tree, Hollow, and birds that bred in it, 61
—— trunk, artificial, Complete success of, 81
Trees, Photographing nests in, 40
Tree-trunk, How to make and use an artificial, for hiding in, 10
Tricks practised by hares, 114
Trout fascinated by artificial light, 168
——, Habits of, 168
——, Instincts of, 169

Urchins, Sea, 176

Vole, Water, How we photographed a, 124
——, ——, The habits of, 123

Wading bogs, Dangers of, 51
Wandering habits of mollusca, 179
Wasps and their nests, 152
—— as drunkards, 154
—— as house-fly catchers, 153
——, Great vitality of, 154
Weasels, Habits of, 120
—— numerous near London, 120
Weather, Effect of, upon slugs, 157
Whale, Dead, 172
——, Spouting of, 172
Whales and the noises they make, 170
Whimbrel's nest, How we found a, 48
Worms, Instinctive movements of, 128
Wren's nest in a coil of rope, 91

Printed by Cassell & Company, Limited, La Belle Sauvage, London E.C.

ADVERTISEMENTS.

Ilford Plates

For Every Purpose.

ILFORD ORDINARY PLATES

ILFORD EMPRESS PLATES

ILFORD SPECIAL RAPID PLATES

ILFORD CHROMATIC PLATES

ILFORD HALF-TONE PLATES

ILFORD PROCESS PLATES

ILFORD LANTERN PLATES

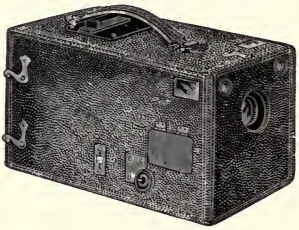
The Britannia Works Company, Limited,

ILFORD, LONDON, ENGLAND.

Photography FOR *Naturalists.*

The ***Simplest*** *Apparatus is*

Dallmeyer's Popular Hand Camera.



Carries 12 Plates (4¼ by 3¼), with Instantaneous Changing Device, Rack Focussing, Everset Shutter, with Speed Regulator, 2 good Finders, and a **Stigmatic Lens** working at *f* 7.5. **Price £7 7s.**

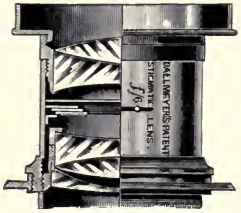
The ***Best*** *is*

The Dallmeyer Hand Camera,

with Special Dark Slides or Removable Magazine, Rising and Cross Front, Bausch & Lomb or Thornton-Pickard Shutter, Rack Focussing, Ground glass Focussing Screen, and 2 Brilliant Finders. Fitted with Stigmatic or Rectilinear Lens, or Customers' own Lenses may be adapted. Price, including Shutter, 6 Double Slides or Magazine, the whole in leather case, but without lens, **£7 2s. 6d.** Full particulars on application.

High-Class Tripod Cameras

in a Variety of Patterns ready for Immediate Delivery.



DALLMEYER'S

Dallmeyer's New Stigmatic Lenses,

f 6,

are the Best for all purposes. Used intact they give perfect results for rapid or wide angle work, the front and back combinations form excellent single landscape lenses working at *f* 16. They give foci 1¾ times and twice that of the entire lens.

New Stigmatic Hand Camera Lens,

f 7.5., 5 in. equiv. focus. Price, with Iris, **£3 17s. 6d.**

J. H. DALLMEYER, LTD., Optical Manufactory, 25, NEWMAN STREET, LONDON, W.

THORNTON-PICKARD

CAMERAS AND SHUTTERS

Make Photography a Pleasure.
The Best Aids to Produce Perfect Pictures.

Time and Instantaneous Shutter.

Simplest and best. Largest sale in the world. Works absolutely without vibration. Avoid inferior foreign imitations, which are made up so as to resemble our manufactures as near as possible, but which do not possess the special features that place our shutters beyond all others.

NO OTHER SHUTTER IS AS CHEAP.

PRICE from **12s. 6d.** **SNAPSHOT** from **8s.**

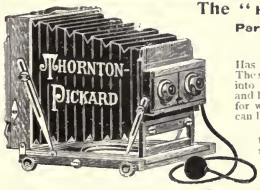
"AMBER" & "RUBY" CAMERAS

FOR HAND OR STAND.

The "AMBER"

has all necessary movements: Swing back and swing front, long and short extension, folding front, and double pinion, independent rise to the front, reversible back, spring focussing screen, self-locking stretcher, plumb indicator.

Complete **"AMBER" OUTFIT, No. 1,** including camera, plate-holder, stand, and rapid rectilinear lens. Quarter-plate, **£5 3s. 6d.**; Half-plate, **£6 5s.**



The "RUBY"—Three Cameras in One.

Perfect as a Stand Camera.
Perfect as a Hand Camera.
Perfect as a Stereoscopic Camera.

Has every movement. May be used in the hand or on a tripod. The shutter is attached to and forms part of the camera, and folds into the baseboard. Unlimited rise and fall. Front, vertical, and horizontal swing. The back can be pushed up to the front for wide-angle lenses. Double focussing pinion. The camera can be used for stereoscopic work.

"RUBY" OUTFIT, including camera, with turn-table, plate-holder, stand, time, and instantaneous shutter with speed indicator. Half-plate, **£7 15s 6d.**

Illustrated Catalogue Post Free from the

Thornton-Pickard Manufacturing Co., Ltd., Altrincham.

A Noted Brand.

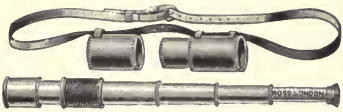
Imperial "Flash-Light" Plates.

The special feature of these famous Plates is their combination of the highest speed with exquisite quality.

Their excellence is acknowledged on all hands, and they are used by the most successful workers everywhere.

OF ALL DEALERS, from

THE IMPERIAL DRY PLATE CO., LTD.
CRICKLEWOOD, LONDON, N.W.

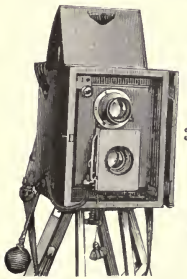


Optical and Photographic Outfits

For AMATEUR PHOTOGRAPHERS,
Naturalists, Sportsmen, Cyclists,
Tourists, Ladies, etc. etc.

Telescopes and Field Glasses,
NEW PRISMATIC BINOCULARS,
Photographic Lenses,
An Absolutely Unrivalled Selection.
Twin-Lens and Film Cameras,
The Smallest, Neatest, and Best.
COMPASSES, ANEROIDS, SEXTANTS,
NEWEST STYLES OF
Eyeglasses and Spectacles,
etc. etc.

CATALOGUES FREE. INSPECTION INVITED.



ROSS, Ltd.,

Manufacturing Opticians,

111, NEW BOND ST., LONDON, W.,
AND
31, COCKSPUR ST., CHARING CROSS, S.W.

ESTAB. 1830.

Gold Medals and Highest Awards at all Great Exhibitions.

PLATINO-MATT BROMIDE.
Smooth, Rough, Tinted Rough, etc.

ENAMMO BROMIDE (GLAZED SURFACE).
Rose, White, and Mauve.

USE THE . . .

"Wellington" Papers.

THEY ARE SUPERB.

SYLVIO P.O.P.
Pink, White, Mauve, and Matt.

SYLVIO "SPECIAL."
For Use with the Sulphocyanide Toning Bath.

NEGATIVE PAPER.
Cut Sheets and Spools.

WRITE FOR ILLUSTRATED PRICE LIST POST FREE.

WELLINGTON & WARD, Elstree, HERTS.

Are you a Photographer

(Amateur or Professional)?

If so, we would direct your attention to the High-Class Goods sold by

TAYLORS' DRUG CO., LTD.

The Great Store Chemists,

MANUFACTURERS, IMPORTERS OF, AND DEALERS IN

PHOTOGRAPHIC APPARATUS, MATERIALS, AND ACCESSORIES,

OPTICAL GOODS, SCIENTIFIC APPARATUS, ETC.

ALL OF THE BEST QUALITY, AND AT

Prices much under those usually charged.

A DARK ROOM is provided for the use of Customers, FREE.

THE "ALBION" OUTFIT

is the Cheapest Reliable Outfit ever offered.

It consists of ½-plate polished Mahogany Camera, well made, and of high class workmanship throughout, and which has all the latest improvements, including swing and reversible back, rising front, rack and pinion focus, and full extensions of bellows for long or short focus lenses. **Three double dark slides (book form)**, ½-plate rapid rectilinear lens (iris diaphragm) of tested capacity, with **pneumatic-snap-shot- roller-blind shutter having speed indicator,** one circular view finder, plumb indicator, tripod, focussing cloth, and waterproof canvas case to hold camera and three slides :—

Price 90s.

The above, with 1 doz. dry plates, a shilling packet of printing-out paper, three dishes, lamp, developing and toning solutions, chemicals, and printing frame, measures, print trimmer, squeegee, 1 doz. cabinet mounts, etc.

Price, Complete, 100s.

Special Terms to Dealers and Professionals.

SEND FOR PRICE LIST, FREE TO ALL APPLICANTS.

TAYLORS' PHOTOGRAPHIC STORES.

Central Stores :

London : 26 and 27, High Holborn, W.C.;
Leeds : 3, 5 and 7, Guildford Street.

AND UPWARDS OF 60 BRANCHES IN

LONDON, LEEDS, BRADFORD, HULL, HARROGATE, SCARBOROUGH, and other large towns throughout the Country.

Ilford Special Lantern Plates,

AS USED BY

Mr. KEARTON for his Slides.

Post Free.

"Ilford Lantern Plates: and How to Use Them."

ILLUSTRATED.

The Britannia Works Company, Limited,

ILFORD, LONDON, E.

A Popular Natural History for Young People.

Price 7s. 6d.

CASSELL'S

Popular History of Animals.

BY

HENRY SCHERREN, F.Z.S.

With 13 COLOURED PLATES and Numerous Illustrations.

"A most admirable work, both in its compilation and its illustration."—*World.*

"This handsome volume may be best described as a juvenile cyclopædia of the animal kingdom."—*Journal of Education.*

"A POPULAR HISTORY OF ANIMALS FOR YOUNG PEOPLE will be regarded in all quarters as a perfect gem."—*Irish Times.*

"In Mr. Scherren's work we get correct descriptions, interesting anecdotes, and the very latest results of zoological observation in every part of the world. In fact, POPULAR HISTORY OF ANIMALS is characterised by three most commendable features—it is accurate, it is interesting, and it is up to date."—*Sketch.*

CASSELL & COMPANY, LIMITED, *London; Paris, New York and Melbourne.*

Cloth, 21s.

With Nature and a Camera.

Being the Adventures and Observations of a Field Naturalist and an Animal Photographer. By **RICHARD KEARTON, F.Z.S.** Illustrated by a Special Frontispiece, and 180 Pictures of Wild Birds, Animals, and Insects at work and play, from Photographs taken direct from Nature by CHERRY KEARTON.

"'With Nature and a Camera' surpasses the sensations of the most romantic of novels, and is lavishly embellished with photographic reproductions of exquisite softness and delicacy."—*The Times.*

"No such collection of pictures of British bird-life has ever been produced, and the text is worthy of the pictures."—*Standard.*

"The net result of all these adventures and displays of patience is a charming book, not only for the bright and breezy way in which it is written, but even more so for the unique pictures on almost every page. Though probably not one person in a thousand will care to emulate Mr. Kearton and his brother, everyone who loves Nature ought to buy, study, and enjoy their wonderful book."—*Daily Telegraph.*

"In this volume the authors have surpassed themselves, on the one hand in their marvellous series of photographs of bird-life, and on the other in the graphic account of their adventures and observations whilst wandering up and down the British Isles in search of subjects for the camera and note-book."—*Daily News.*

CASSELL & COMPANY, LIMITED, *London; Paris, New York & Melbourne.*

Buckram gilt, price 21s.

British Birds' Nests: How, Where, and When to Find and Identify Them.

By **RICHARD KEARTON, F.Z.S.** With an Introduction by DR. BOWDLER SHARPE. Containing nearly 130 Illustrations of Nests, Eggs, Young, etc., in their natural situations and surroundings, from Photographs by C. KEARTON.

"However much we may admire the woodcuts of Bewick or the drawings of Joseph Wolf, there can be no doubt that the witness of the camera comes first in order of authenticity; and if in science the first thing we look for is truth, the man who, often at the hazard of his life, has secured true evidence is he who deserves the chief praise. We are very grateful to Mr. Kearton and his brother for what they have accomplished, and only hope that they will be encouraged to add many new illustrations to those which they have given us already. It may be added that Mr. R. Kearton's brief descriptions of all the known British nests are clear and accurate."—*The Times.*

"The reproductions are admirable. Mr. Kearton writes well, and has obviously the genuine enthusiasm for Nature; and the two brothers between them have produced a volume that all bird-lovers will admire."—*Daily Telegraph.*

"It is a book illustrated by a series of considerably more than a hundred reproductions of photographs, most of which are remarkable for their excellence and beauty."—*Daily News.*

"The author of this volume is a realist of the right sort. It is difficult to over estimate the value of these accurate pictures, which are accompanied by sufficient explanatory text."—*Daily Chronicle.*

"The illustrations show things as they are, and not as they are imagined to be; and this for a true aid to the study of ornithology, as of any other department of natural history, is of course what is wanted. The book is altogether most interesting and attractive."—*Westminster Gazette.*

REVISED AND ENLARGED EDITION.

Birds' Nests, Eggs, and Egg-Collecting.

By RICHARD KEARTON, F.Z.S.

Illustrated with 22 *Coloured Plates of Eggs. Price* 5*s.*

"A really charming little book."—*Newcastle Chronicle.*

CASSELL & COMPANY, LIMITED, *London; Paris, New York & Melbourne.*

A SELECTED LIST

OF

CASSELL & COMPANY'S

PUBLICATIONS.

6G - 10.98

Illustrated, Fine Art, and other Volumes.

Adventure, The World of. Fully Illustrated. Complete in Three Vols. 9s. each.

Adventures in Criticism. By A. T. QUILLER-COUCH. 6s.

Africa and its Explorers, The Story of. By Dr. ROBERT BROWN, F.R.G.S., &c. With about 800 Original Illustrations. *Cheap Edition.* In 4 Vols. 4s. each.

Animals, Popular History of. By HENRY SCHERREN, F.Z.S. With 13 Coloured Plates and other Illustrations. 7s. 6d.

Architectural Drawing. By R. PHENÉ SPIERS. Illustrated. 10s. 6d.

Art, Sacred. With nearly 200 Full-page Illustrations and Descriptive Text. In one Vol., 9s.

Art, The Magazine of. With Exquisite Photogravures, a Series of Full-page Plates, and hundreds of Illustrations. *Yearly Volume*, 21s.

Artistic Anatomy. By Prof. M. DUVAL. *Cheap Edition*, 3s. 6d.

Ballads and Songs. By WILLIAM MAKEPEACE THACKERAY. With Original Illustrations by H. M. BROCK. 6s.

Barber, Charles Burton, The Works of. With Forty-one Plates and Portraits, and Introduction by HARRY FURNISS. *Cheap Edition*, 7s. 6d.

Battles of the Nineteenth Century. An entirely New and Original Work, with Several Hundred Illustrations. Complete in Two Vols., 9s. each.

"Belle Sauvage" Library, The. Cloth, 2s. (*A complete list of the volumes post free on application.*)

Beetles, Butterflies, Moths, and other Insects. By A. W. KAPPEL, F.L.S., F.E.S., and W. EGMONT KIRBY. With 12 Coloured Plates. 3s. 6d.

Biographical Dictionary, Cassell's New. Containing Memoirs of the Most Eminent Men and Women of all Ages and Countries. *Cheap Edition.* 3s. 6d.

Birds' Nests, British: How, Where, and When to Find and Identify Them. By R. KEARTON, F.Z.S. With nearly 130 Illustrations of Nests, Eggs, Young, &c., from Photographs by C. KEARTON. 21s.

Birds' Nests, Eggs, and Egg-Collecting. By R. KEARTON, F.Z.S. Illustrated with 22 Coloured Plates of Eggs. *Enlarged Edition.* 5s.

Black Watch, The. The Record of an Historic Regiment. By ARCHIBALD FORBES, LL.D. 6s.

Britain's Roll of Glory; or, the Victoria Cross, its Heroes, and their Valour. By D. H. PARRY. Illustrated. *Cheap and Enlarged Edition.* 3s. 6d.

British Ballads. With 300 Original Illustrations. *Cheap Edition.* Two Volumes in One. Cloth, 7s. 6d.

British Battles on Land and Sea. By JAMES GRANT. With about 800 Illustrations. *Cheap Edition.* Four Vols., 3s. 6d. each.

Building World. In Half-Yearly Volumes, 4s. each.

Butterflies and Moths, European. By W. F. KIRBY. With 61 Coloured Plates, 35s.

By a Hair's Breadth. By HEADON HILL. *Illustrated Edition.* 6s.

Canaries and Cage-Birds, The Illustrated Book of. By W. A. BLAKSTON, W. SWAYSLAND, and A. F. WIENER. With 56 Facsimile Coloured Plates. 35s.

Cassell's Magazine. Yearly Volume, 8s.; Half-Yearly Volume, 5s.

Cathedrals, Abbeys, and Churches of England and Wales. Descriptive, Historical, Pictorial. *Popular Edition.* Two Vols. 12s. the set.

Cats and Kittens. By HENRIETTE RONNER. With Portrait and 13 magnificent Full-page Photogravure Plates and numerous Illustrations. 4to, £2 10s.

China Painting. By FLORENCE LEWIS. With Sixteen Coloured Plates, &c. 5s.

Choice Dishes at Small Cost. By A. G. PAYNE. *Cheap Edition*, 1s.

Chums. The Illustrated Paper for Boys. Yearly Volume, 8s.

Cities of the World. Four Vols. Illustrated. 7s. 6d. each.

Civil Service, Guide to Employment in the. *Entirely New Edition.* Paper, 1s.; cloth, 1s. 6d.

Clinical Manuals for Practitioners and Students of Medicine. (*A List of Volumes forwarded post free on application to the Publishers.*)

Cobden Club, Works published for the. (*A Complete List on application.*)

Colour. By Prof. A. H. CHURCH. *New and Enlarged Edition*, 3s. 6d.

Combe, George, The Select Works of. Issued by Authority of the Combe Trustees. *Popular Edition*, 1s. each, net.

The Constitution of Man. Moral Philosophy. Science and Religion. Discussions on Education. American Notes.

Conning Tower, In a; or, How I Took H.M.S. "Majestic" into Action. By H. O. ARNOLD-FORSTER, M.P. *Cheap Edition.* Illustrated. 6d.

Conquests of the Cross. Edited by EDWIN HODDER. With numerous Original Illustrations. Complete in Three Vols. 9s. each.

Cookery, Cassell's Dictionary of. With about 9,000 Recipes. 5s.

Cookery, A Year's. By PHYLLIS BROWNE. *Cheap Edition.* Limp cloth, 1s.

Cookery Book, Cassell's New Universal. By LIZZIE HERITAGE. With 12 Coloured Plates and other Illustrations. 1,344 pages, strongly bound in leather gilt, 6s.

Cookery, Cassell's Popular. With Four Coloured Plates. Cloth gilt, 2s.

Cookery, Cassell's Shilling. 135*th Thousand.* 1s.

Cookery for Common Ailments. By a Fellow of the Royal College of Physicians and PHYLLIS BROWNE. *Cheap Edition.* 1s.

Cookery, Vegetarian. By A. G. PAYNE. *Cheap Edition.* 1s.

Cooking by Gas, The Art of. By MARIE J. SUGG. Illustrated. Cloth, 2s.

Cottage Gardening. Illustrated. Half-yearly Vols., 2s. 6d. each.

Countries of the World, The. By Dr. ROBERT BROWN, M.A., F.L.S. With about 750 Illustrations. *Cheap Edition.* Vols. I. to V., 6s. each.

Cyclopædia, Cassell's Concise. With about 600 Illustrations. 5s.

Cyclopædia, Cassell's Miniature. Containing 30,000 Subjects. *Cheap and Revised Edition.* Limp cloth, 1s. Cloth gilt, 1s. 6d.

Dainty Breakfasts, The Dictionary of. By PHYLLIS BROWNE. 1s.

Dead Man's Rock. A Romance by Q. (A. T. QUILLER-COUCH). *Library Edition*, 5s. *People's Edition*, 6d.

Dictionaries. (For description, see alphabetical letter.) Religion, Biographical, Encyclopædic, Concise Cyclopædia, Miniature Cyclopædia, Mechanical, English, English History, Phrase and Fable, Cookery. (French, German, and Latin see with *Educational Works.*)

Dog, Illustrated Book of the. By VERO SHAW, B.A. With 28 Coloured Plates. Cloth bevelled, 35s.; half-morocco, 45s.

Doré Don Quixote, The. With about 400 Illustrations by GUSTAVE DORÉ. *Cheap Edition.* Cloth, 10s. 6d.

Doré Gallery, The. With 250 Illustrations by GUSTAVE DORÉ. 4to, 42s.

Doré's Dante's Inferno. Illustrated by GUSTAVE DORÉ. *Popular Edition.* With Preface by A. J. BUTLER. Cloth gilt or buckram, 7s. 6d.

Doré's Dante's Purgatory and Paradise. Illustrated by GUSTAVE DORÉ. *Cheap Edition.* 7s. 6d.

Doré's Milton's Paradise Lost. Illustrated by GUSTAVE DORÉ. 4to, 21s. *Popular Edition.* Cloth gilt, or buckram gilt, 7s. 6d.

Earth, Our, and its Story. Edited by Dr. ROBERT BROWN, F.L.S. With 36 Coloured Plates and nearly 800 Wood Engravings. In Three Vols. 9s. each.

Edinburgh, Old and New, Cassell's. With 600 Illustrations. Three Vols. 9s. each; library binding, £1 10s. the set.

Egypt: Descriptive, Historical, and Picturesque. By Prof. G. EBERS. Translated by CLARA BELL, with Notes by SAMUEL BIRCH, LL.D., &c. Two Vols. 42s.

Electric Current, The. How Produced and How Used. By R. MULLINEUX WALMSLEY, D.Sc., &c. Illustrated. 10s. 6d.

Electricity, Practical. By Prof. W. E. AYRTON, F.R.S. *Entirely New and Enlarged Edition.* Completely re-written. Illustrated. 9s.

Electricity in the Service of Man. A Popular and Practical Treatise. With upwards of 950 Illustrations. *New and Cheaper Edition*, 7s. 6d.

Employment for Boys on Leaving School, Guide to. By W. S. BEARD, F.R.G.S. 1s. 6d.

Encyclopædic Dictionary, The. Complete in Fourteen Divisional Vols., 10s. 6d. each; or Seven Vols., half-morocco, 21s. each; half-russia, 25s. each.

England and Wales, Pictorial. With upwards of 320 beautiful illustrations prepared from copyright photographs. 9s. Also an edition on superior paper, bound in half-persian, marble sides, gilt edges, and in box, 15s. net.

England, A History of. From the Landing of Julius Cæsar to the Present Day. By H. O. ARNOLD-FORSTER, M.P. Fully Illustrated, 5s.

England, Cassell's Illustrated History of. From the earliest period to the present time. With upwards of 2,000 Illustrations. New Serial issue in Parts, 6d. each.

English Dictionary, Cassell's. Containing Definitions of upwards of 100,000 Words and Phrases. *Cheap Edition*, 3s. 6d.; *Superior Edition*, 5s.

English History, The Dictionary of. Edited by SIDNEY LOW, B.A., and Prof. F. S. PULLING, M.A., with Contributions by Eminent Writers. *New Edition.* 7s. 6d.

English Literature, Library of. By Prof. H. MORLEY. In 5 Vols. 7s. 6d. each.

English Literature, Morley's First Sketch of. *Revised Edition.* 7s. 6d.

English Literature, The Story of. By ANNA BUCKLAND. 3s. 6d.

English Writers from the Earliest Period to Shakespeare. By HENRY MORLEY. Eleven Vols. 5s. each.

Æsop's Fables. Illustrated by ERNEST GRISET. *Cheap Edition.* Cloth, 3s. 6d.; bevelled boards, gilt edges, 5s.

Etiquette of Good Society. *New Edition.* Edited and Revised by LADY COLIN CAMPBELL. 1s.; cloth, 1s. 6d.

Fairy Tales Far and Near. Retold by Q. (A. T. QUILLER-COUCH). Illus. 3s. 6d.

Fairway Island. By HORACE HUTCHINSON. *Cheap Edition.* 2s. 6d.

Family Doctor, Cassell's. By A MEDICAL MAN. Illustrated, 10s. 6d.

Family Lawyer, Cassell's. An Entirely New and Original Work. By a Barrister-at-Law. 10s 6d.

Far East, The New. By ARTHUR DIÓSY, Vice-Chairman of Council of the Japan Society. With a Map and Illustrations. 16s.

Fiction, Cassell's Popular Library of. 3s. 6d. each.

Cupid's Garden. By ELLEN THORNEYCROFT FOWLER.
The Sea Wolves. By MAX PEMBERTON.
Loveday. By A. E. WICKHAM.
Tiny Luttrell. By E. W. Hornung.
The White Shield. By Bertram Mitford.
Tuxter's Little Maid. By C. B. Burgin.
The Hispaniola Plate. 1683—1893.) By John Bloundelle Burton.
Highway of Sorrow. By Hesba Stretton and * * * * * *, a Famous Russian Exile.
King Solomon's Mines. By H. Rider Haggard. (Also People's Edition, 6d.)
The Lights of Sydney. By Lilian Turner.
The Admirable Lady Biddy Fane. By Frank Barrett.
Out of the Jaws of Death. By Frank Barrett.
List, ye Landsmen! A Romance of Incident. By W. Clark Russell.
Ia: A Love Story. By Q.
The Red Terror: A Story of the Paris Commune. By Edward King.
The Little Squire. By Mrs. Henry de la Pasture.
Zero, the Slaver. A Romance of Equatorial Africa. By Lawrence Fletcher.
Into the Unknown! A Romance of South Africa. By Lawrence Fletcher.
Mount Desolation. An Australian Romance. By W. Carlton Dawe.
Pomona's Travels. By Frank R. Stockton.
The Reputation of George Saxon. By Morley Roberts.
A Prison Princess. By Major Arthur Griffiths.
Queen's Scarlet, The. By George Manville Fenn.
Capture of the "Estrella," The. A Tale of the Slave Trade. By Commander Claud Harding, R.N.
The Awkward Squads. And other Ulster Stories. By Shan F. Bullock.
A King's Hussar. By Herbert Compton.
A Free-Lance in a Far Land. By Herbert Compton.
Playthings and Parodies. Short Stories, Sketches, &c. By Barry Pain.
Fourteen to One, &c. By Elizabeth Stuart Phelps.
The Medicine Lady. By L. T. Meade.
Father Stafford. By Anthony Hope.
"La Bella," and others. By Egerton Castle.
The Avenger of Blood. By J. Maclaren Cobban.
The Man in Black. By Stanley Weyman.
The Doings of Raffles Haw. By A. Conan Doyle.

Field Naturalist's Handbook, The. By Revs. J. G. WOOD and THEODORE WOOD. *Cheap Edition*, 2s. 6d.

Figuier's Popular Scientific Works. With Several Hundred Illustrations in each. 3s. 6d. each. The Insect World. The Human Race. Reptiles and Birds. Mammalia. The World before the Deluge. The Vegetable World. The Ocean World.

Flora's Feast. A Masque of Flowers. Penned and Pictured by WALTER CRANE. With 40 pages in Colours. 5s.

Flower Painting, Elementary. With Eight Coloured Plates. 3s.

Flowers, and How to Paint Them. By MAUD NAFTEL. With Coloured Plates. 5s.

Football: the Rugby Union Game. Edited by Rev. F. MARSHALL. Illustrated. *New and Enlarged Edition.* 7s. 6d.

For Glory and Renown. By D. H. PARRY. Illustrated. *Cheap Edition.* 3s. 6d.

Fossil Reptiles, A History of British. By Sir RICHARD OWEN, F.R.S., &c. With 268 Plates. In Four Vols. £12 12s.

Franco-German War, Cassell's History of the. Complete in Two Vols., containing about 500 Illustrations. 9s. each.

Garden Flowers, Familiar. By F. E. HULME, F.L.S., F.S.A. With 200 Full-page Coloured Plates, and Descriptive Text by SHIRLEY HIBBERD. *Cheap Edition.* In Five Vols., 3s. 6d. each.

Girl at Cobhurst, The. By FRANK R. STOCKTON. 6s.

Gladstone, The Right Hon. W. E., Cassell's Life of. Profusely Illustrated. 1s.
Gleanings from Popular Authors. With Original Illustrations. *Cheap Edition.* In One Vol., 3s. 6d.
Grace O'Malley, Princess and Pirate. By ROBERT MACHRAY. 6s.
Gulliver's Travels. With 88 Engravings. Cloth, 3s. 6d. ; cloth gilt, 5s.
Gun and its Development, The. By W. W. GREENER. With 500 Illustrations. *Entirely New Edition*, 10s. 6d.
Guns, Modern Shot. By W. W. GREENER. Illustrated. 5s.
Health, The Book of. By Eminent Physicians and Surgeons. Cloth, 21s.
Heavens, The Story of the. By Sir ROBERT STAWELL BALL, LL.D., F.R.S. With Coloured Plates and Wood Engravings. *Popular Edition*, 10s. 6d.
Heroes of Britain in Peace and War. With 300 Original Illustrations. *Cheap Edition.* Complete in One Vol., 3s. 6d.
History, A Foot-note to. Eight Years of Trouble in Samoa. By R. L. STEVENSON. 6s.
Home Life of the Ancient Greeks, The. Translated by ALICE ZIMMERN. Illustrated. *Cheap Edition.* 5s.
Horse, The Book of the. By SAMUEL SIDNEY. With 17 Full-page Collotype Plates of Celebrated Horses of the Day, and numerous other Illustrations. Cloth, 15s.
Horses and Dogs. By O. EERELMAN. With Descriptive Text. Translated from the Dutch by CLARA BELL. With Fifteen Full-page and other Illustrations. 25s. net.
Houghton, Lord : The Life, Letters, and Friendships of Richard Monckton Milnes, First Lord Houghton. By Sir WEMYSS REID. Two Vols. 32s.
Hygiene and Public Health. By B. ARTHUR WHITELEGGE, M.D. Illustrated. *New and Revised Edition.* 7s. 6d.
Impregnable City, The. By MAX PEMBERTON. *Library Edition*, 6s. *Cheap Edition*, 3s. 6d.
India, Cassell's History of. In One Vol. *Cheap Edition.* 7s. 6d.
In-door Amusements, Card Games, and Fireside Fun, Cassell's Book of. With numerous Illustrations. *Cheap Edition.* Cloth, 2s.
Iron Pirate, The. By MAX PEMBERTON. Illus. *Cheap Edition*, 3s. 6d.
Khiva, A Ride to. By Col. FRED BURNABY. *New Edition.* Illustrated. 3s. 6d.
Kilogram; The Coming of the, or, The Battle of the Standards. By H. O. ARNOLD-FORSTER, M.P. Illustrated. 2s. 6d.
King George, In the Days of. By Col. PERCY GROVES. Illustrated. 1s. 6d.
King Solomon's Mines. By H. RIDER HAGGARD. Illustrated. 3s. 6d. *People's Edition.* 6d.
Kronstadt. A New Novel. By MAX PEMBERTON. With 8 Full-page Plates. 6s.
Ladies' Physician, The. By a London Physician. *Cheap Edition, Revised and Enlarged.* 3s. 6d.
Lady's Dressing-Room, The. Translated from the French by Lady COLIN CAMPBELL. *Cheap Edition.* 2s. 6d.
Letts's Diaries and other Time-saving Publications are now published exclusively by CASSELL & COMPANY. (*A List sent post free on application.*)
Little Huguenot, The. *New Edition.* 1s. 6d.
Locomotive Engine, The Biography of a. By HENRY FRITH. 3s. 6d.
Loftus, Lord Augustus, P.C., G.C.B., The Diplomatic Reminiscences of. First Series. With Portrait. Two Vols. 32s. Second Series. Two Vols. 32s.
London, Cassell's Guide to. With Numerous Illustrations. 6d. Cloth, 1s.
London, Greater. By EDWARD WALFORD. Two Vols. With about 400 Illustrations. *Cheap Edition*, 4s. 6d. each. *Library Edition.* Two Vols. £1 the set.
London, Old and New. By WALTER THORNBURY and EDWARD WALFORD. Six Vols., with about 1,200 Illustrations. [*Cheap Ed.*, 4s. 6d. each. *Library Ed.*, £3.
Manchester, Old and New. By WILLIAM ARTHUR SHAW, M.A. With Original Illustrations. Three Vols., 31s. 6d.
Mechanics, The Practical Dictionary of. Three Vols., £3 3s. ; half-morocco, £3 15s. Supplementary Volume, £1 1s. ; or half-morocco, £1 5s.
Medical Handbook of Life Assurance. By JAMES EDWARD POLLOCK, M.D., and JAMES CHISHOLM. *New and Revised Edition.* 7s. 6d.
Medicine, Manuals for Students of. (*A List forwarded post free on application.*)
Mesdag, H. W., the Painter of the North Sea. With Etchings and Descriptive Text. By PH. ZILCKEN. The Text translated from the Dutch by CLARA BELL. 36s.
Modern Europe, A History of. By C. A. FYFFE, M.A. *Cheap Edition in One Volume*, 10s. 6d. ; *Library Edition, Illustrated*, 3 vols., 7s. 6d. each.

Music, Illustrated History of. By EMIL NAUMANN. Edited by the Rev. Sir F. A. GORE OUSELEY, Bart. Illustrated. Two Vols. 31s. 6d.

National Library, Cassell's. Consisting of 214 Volumes. Paper covers, 3d.; cloth, 6d. (*A Complete List of the Volumes post free on application.*)

Natural History, Cassell's Concise. By E. PERCEVAL WRIGHT, M.A., M.D., F.L.S. With several Hundred Illustrations. 7s. 6d.

Natural History, Cassell's New. Edited by P. MARTIN DUNCAN, M.B., F.R.S., F.G.S. *Cheap Edition.* With about 2,000 Illusts. Three Double Vols., 6s. each.

Nature and a Camera, With. Being the Adventures and Observations of a Field Naturalist and an Animal Photographer. By RICHARD KEARTON, F.Z.S. With Frontispiece, and 180 Pictures from Photographs by CHERRY KEARTON. 21s.

Nature's Wonder-Workers. By KATE R. LOVELL. Illustrated. 2s. 6d.

Nelson, The Life of. By ROBERT SOUTHEY. Illustrated with Eight Plates. 3s. 6d.

Newman Hall: An Autobiography. With Portrait and Frontispiece. 12s. 6d.

New Zealand, Pictorial. With Preface by Sir W. B. PERCEVAL, K.C.M.G. Illust. 6s.

Novels, Popular. Extra crown 8vo, cloth, 6s. each.

Potsherds. By MABEL C. BIRCHENOUGH (Mrs. HENRY BIRCHENOUGH).
The Refiner's Fire. By M. HOCKLIFFE.
Grace O'Malley, Princess and Pirate. By ROBERT MACHRAY.
A Limited Success. By SARAH PITT.
The Wrothams of Wrotham Court. By FRANCES HEATH FRESHFIELD.
Ill-gotten Gold: A Story of a Great Wrong and a Great Revenge. By W. G. TARBET.
Sentimental Tommy. } By J. M. BARRIE.
The Little Minister. }
From the Memoirs of a Minister of France. } By STANLEY WEYMAN.
The Story of Francis Cludde. }
Kronstadt. }
Puritan's Wife, A. } By MAX PEMBERTON.
The Impregnable City. }
Also Cheap Edition, 3s. 6d. }
Some Persons Unknown. }
Young Blood. } By E. W. HORNUNG.
My Lord Duke. }
Rogue's March, The. }
Spectre Gold. }
By a Hair's-Breadth. } By HEADON HILL.
Illustrated Edition. }
The Girl at Cobhurst. }
Story Teller's Pack, A. } By FRANK STOCKTON.
Mrs. Cliff's Yacht. }
The Adventures of Captain Horn. }
Treasure Island. (Also People's Edition, 6d.) }
The Master of Ballantrae. }
The Black Arrow. } By ROBERT LOUIS STEVENSON. } Also a *Popular Edition*, 3s. 6d. each.
Kidnapped. (Also People's Edition, 6d.) }
Catriona: A Sequel to "Kidnapped." }
Island Nights' Entertainments. }
The Wrecker. By ROBERT LOUIS STEVENSON and LLOYD OSBOURNE. }
What Cheer! By W. CLARK RUSSELL. }

Nursing for the Home and for the Hospital, A Handbook of. By CATHERINE J. WOOD. *Cheap Edition*, 1s. 6d.; cloth, 2s.

Nursing of Sick Children, A Handbook for the. By CATHERINE J. WOOD. 2s. 6d.

Our own Country. With 1,200 Illustrations. *Cheap Edition.* 3 Double Vols. 5s. each.

Painting, The English School of. By ERNEST CHESNEAU. *Cheap Edition*, 3s. 6d.

Paris, Old and New. Illustrated. In Two Vols. 9s. or 10s. 6d. each.

Peoples of the World, The. By Dr. ROBERT BROWN, F.L.S. Complete in Six Vols. With Illustrations. 7s. 6d. each.

Phrase and Fable, Dr. Brewer's Dictionary of. *Entirely New and largely increased Edition.* 10s. 6d. Also in half-morocco, 2 Vols., 15s.

Physiology for Students, Elementary. By ALFRED T. SCHOFIELD, M.D., M.R.C.S. With Two Coloured Plates and numerous Illustrations. *New Edition.* 5s.

Picturesque America. Complete in Four Vols., with 48 Exquisite Steel Plates, and about 800 Original Wood Engravings. £12 12s. the set. *Popular Edition* in Four Vols., price 18s. each.

Picturesque Australasia, Cassell's. With upwards of 1,000 Illustrations. In Four Vols., 7s. 6d. each.

Picturesque Canada. With about 600 Original Illustrations. 2 Vols. £9 9s. the set.

Picturesque Europe. *Popular Edition.* Complete in Five Vols. Each containing 13 Exquisite Litho Plates, from Original Drawings, and nearly 200 Original Illustrations. 18s. each. (The British Isles.) Two Vols. in One. *Cheap Edition.* 10s. 6d.

Picturesque Mediterranean, The. With a Series of Magnificent Illustrations from Original Designs by leading Artists of the day. Two Vols. Cloth, £2 2s. each.

Pigeons, Fulton's Book of. Edited by LEWIS WRIGHT. Revised, Enlarged, and Supplemented by the Rev. W. F. LUMLEY. With 50 Full-page Illustrations. *Popular Edition.* In One Vol., 10s. 6d. *Original Edition*, with 50 Coloured Plates and numerous Wood Engravings. 21s.

Planet, The Story of Our. By Prof. BONNEY, F.R.S., &c. With Coloured Plates and Maps and about 100 Illustrations. *Cheap Edition.* 7s. 6d.

Police and Crime, Mysteries of the. A General Survey of Wrong-doing and Its Pursuit. By MAJOR ARTHUR GRIFFITHS. Two Vols. 21s.

Polytechnic Series, The. Practical Illustrated Manuals. (*A List will be sent on application.*)

Portrait Gallery, Cassell's Universal. Containing 240 Portraits of Celebrated Men and Women of the Day. Cloth, 6s.

Portrait Gallery, The Cabinet. Complete in Five Series, each containing 36 Cabinet Photographs of Eminent Men and Women of the day. 15s. each.

Potsherds. By MABEL C. BIRCHENOUGH. (Mrs. HENRY BIRCHENOUGH.) 6s.

Poultry, The Book of. By LEWIS WRIGHT. *Popular Edition.* Illustrated. 10s. 6d.

Poultry, The Illustrated Book of. By LEWIS WRIGHT. With Fifty Coloured Plates, and numerous Wood Engravings. *New Edition in Preparation.*

"Punch," The History of. By M. H. SPIELMANN. With nearly 170 Illustrations, Portraits, and Facsimiles. Cloth, 16s.; *Large Paper Edition*, £2 2s. net.

Q's Works, Uniform Edition of. 5s. each.

Dead Man's Rock. (Also People's Edition, 6d.)	The Astonishing History of Troy Town.
The Splendid Spur.	"I Saw Three Ships," and other Winter's Tales.
The Delectable Duchy. Stories, Studies, and Sketches.	Noughts and Crosses.
	Wandering Heath.
	The Blue Pavilions.

Queen Summer; or, The Tourney of the Lily and the Rose. Penned and Portrayed by WALTER CRANE. With 40 pages in Colours. 6s.

Queen Victoria, The Life and Times of. By ROBERT WILSON. Complete in 2 Vols. With numerous Illustrations. 9s. each.

Queen's Empire, The. First Volume, containing about 300 Splendid Full-page Illustrations. 9s. (To be completed in Two Vols.)

Queen's London, The. Containing Exquisite Views of London and its Environs, together with a fine series of Pictures of the Queen's Diamond Jubilee Procession. *Enlarged Edition*, 10s. 6d.

Railway Guides, Official. With Illustrations on nearly every page, Maps, &c. Paper covers, 1s.; cloth, 1s. 6d.

London and North Western Railway.	Great Eastern Railway.
Great Western Railway.	London and South Western Railway.
Midland Railway.	London, Brighton and South Coast Railway.
Great Northern Railway.	South Eastern Railway.

Abridged and Popular Editions of the above Guides can also be obtained. Paper covers, 3d. each.

Railways, Our. Their Origin, Development, Incident, and Romance. By JOHN PENDLETON. Illustrated. 2 Vols., 12s.

Rebellion of Lil Carrington, The. By L. T. MEADE. With Eight Original Full-page Illustrations. 3s. 6d.

Rivers of Great Britain: Descriptive, Historical, Pictorial.

Rivers of the South and West Coasts. With Frontispiece and Numerous Illustrations. 42s.
The Royal River: The Thames from Source to Sea. *Popular Edition*, 16s.
Rivers of the East Coast. With highly-finished Engravings. *Popular Edition* 16s.

Robinson Crusoe. *Cassell's New Fine-Art Edition. Cheap Edition*, 3s. 6d. or 5s.

Rogues of the Fiery Cross. By S. WALKEY. With 16 Full-page Illustrations. 5s.

Ronner, Henriette, The Painter of Cat-Life and Cat-Character. By M. H. SPIELMANN. Containing a Series of beautiful Phototype Illustrations. 12s.

Royal Academy Pictures. With upwards of 200 magnificent reproductions of Pictures in the Royal Academy. 7s. 6d.

Russo-Turkish War, Cassell's History of. With about 400 Illustrations. *New Edition.* In Two Vols., 9s. each.

Sala, George Augustus, The Life and Adventures of. By Himself. *Cheap Edition.* One Vol., 7s. 6d.

Saturday Journal, Cassell's. Illustrated throughout. Yearly Vol., 7s. 6d.

Scarlet and Blue; or, Songs for Soldiers and Sailors. By JOHN FARMER. 5s. Words only, paper, 6d. ; cloth, 9d. *Cheap Edition*, 1d.

Science for All. Edited by Dr. ROBERT BROWN, M.A., F.L.S., &c. *Cheap Edition.* With over 1,700 Illustrations. Five Vols. 3s. 6d. each.

Science Series, The Century. Consisting of Biographies of Eminent Scientific Men of the present Century. Edited by Sir HENRY ROSCOE, D.C.L., F.R.S., M.P. Crown 8vo, 3s. 6d. each.

Pasteur. By PERCY FRANKLAND, F.R.S., and Mrs. FRANKLAND.
John Dalton and the Rise of Modern Chemistry. By Sir HENRY E. ROSCOE, F.R.S.
Major Rennell, F.R.S., and the Rise of English Geography. By Sir CLEMENTS R. MARKHAM, C.B., F.R.S., President of the Royal Geographical Society.
Justus Von Liebig: His Life and Work. By W. A. SHENSTONE.
The Herschels and Modern Astronomy. By Miss AGNES M. CLERKE.
Charles Lyell and Modern Geology. By Professor T. G. BONNEY, F.R.S.
J. Clerk Maxwell and Modern Physics. By R. T. GLAZEBROOK, F.R.S.
Humphry Davy, Poet and Philosopher. By T. E. THORPE, F.R.S.
Charles Darwin and the Theory of Natural Selection. By EDWARD B. POULTON, M.A., F.R.S.
Michael Faraday, His Life and Work. By Prof. SILVANUS P. THOMPSON, F.R.S. 5s.

Scotland, Picturesque and Traditional. By G. E. EYRE-TODD. 6s.

Sea, The Story of the. An Entirely New and Original Work. Edited by Q. Illustrated. Complete in Two Vols., 9s. each. *Cheap Edition*, 5s. each.

Sea-Wolves, The. By MAX PEMBERTON. Illustrated. *Cheap Edition*, 3s. 6d.

Shaftesbury, The Seventh Earl of, K.G., The Life and Work of. By EDWIN HODDER. Illustrated. *Cheap Edition*, 3s. 6d.

Shakespeare, Cassell's Quarto Edition. Edited by CHARLES and MARY COWDEN CLARKE, and containing about 600 Illustrations by H. C. SELOUS. Complete in Three Vols., cloth gilt, £3 3s.—Also published in Three separate Vols., in cloth, viz. :—The COMEDIES, 21s. ; The HISTORICAL PLAYS, 18s. 6d. ; The TRAGEDIES, 25s.

Shakespeare, The England of. *New Edition.* By E. GOADBY. With Full-page Illustrations. Crown 8vo, 224 pages, 2s. 6d.

Shakespeare, The Plays of. Edited by Prof. HENRY MORLEY. Complete in 13 Vols. cloth, in box, 21s. ; also 39 Vols., cloth, in box, 21s. ; half-morocco, cloth sides, 42s.

Shakspere, The Leopold. With 400 Illustrations, and an Introduction by F. J. FURNIVALL. *Cheap Edition*, 3s. 6d. Cloth gilt, gilt edges, 5s. ; roxburgh, 7s. 6d.

Shakspere, The Royal. With 50 Full-page Illustrations. Complete in Three Vols. 10s. 6d. the set.

Shellback, The : or at Sea in the 'Sixties. By ALEC J. BOYD. Illustrated. 5s.

Sights and Scenes in Oxford City and University. With 100 Illustrations after Original Photographs. In One Vol. 21s. net.

Sketches, The Art of Making and Using. From the French of G. FRAIPONT. By CLARA BELL. With Fifty Illustrations. 2s. 6d.

Social England. A Record of the Progress of the People. By various Writers. Edited by H. D. TRAILL, D.C.L. Complete in Six Vols. Vols. I. (Revised Ed.), II., and III., 15s. each. Vols. IV. and V., 17s. each. Vol. VI., 18s.

Spectre Gold. A Novel. By HEADON HILL. Illustrated. 6s.

Sports and Pastimes, Cassell's Complete Book of. *Cheap Edition*, 3s. 6d.

Star-Land. By Sir ROBERT STAWELL BALL, LL.D., &c. Illustrated. 6s.

Story of My Life, The. By the Rt. Hon. Sir RICHARD TEMPLE, Bart., G.C.S.I., &c. Two Vols. 21s.

Sun, The Story of the. By Sir ROBERT STAWELL BALL, LL.D., F.R.S., F.R.A.S. With Eight Coloured Plates and other Illustrations. *Cheap Edition*, 10s. 6d.

Taxation, Municipal, at Home and Abroad. By J. J. O'MEARA. 7s. 6d.

Thames, The Tidal. By GRANT ALLEN. With India Proof Impressions of 20 Magnificent Full-page Photogravure Plates, and many other Illustrations, after original drawings by W. L. WYLLIE, A.R.A. *New Edition*, cloth, 42s. net.

Things I have Seen and People I have Known. By G. A. SALA. With Portrait and Autograph. 2 Vols. 21s.

Three Homes, The. By the Very Rev. Dean FARRAR, D.D., F.R.S. *New Edition.* With 8 Full-page Illustrations. 6s.

To the Death. By R. D. CHETWODE. With Four Plates. 5s.

Treasure Island. A Story of Pirates and the Spanish Main. By R. L. STEVENSON. Illustrated. *Library Edition* 6s. *Popular Edition*, 3s. 6d. *People's Edition*, paper. 6d.

Treatment, The Year-Book of, for 1898. A Critical Review for Practitioners of Medicine and Surgery. Fourteenth Year of Issue. 7s. 6d.

Trees, Familiar. By Prof. G. S. BOULGER, F.L.S., F.G.S. In Two Series. With Forty Coloured Plates in each. 12s. 6d. each.

Uncle Tom's Cabin. By HARRIET BEECHER STOWE. With upwards of 100 Original Illustrations. *Fine Art Memorial Edition.* 7s. 6d.

"Unicode": The Universal Telegraphic Phrase Book. Pocket or Desk Edition. 2s. 6d. each.

United States, Cassell's History of the. By EDMUND OLLIER. With 600 Illustrations. Three Vols. 9s. each.

Universal History, Cassell's Illustrated. With nearly ONE THOUSAND ILLUSTRATIONS. Vol. I. Early and Greek History.—Vol. II. The Roman Period.—Vol. III. The Middle Ages.—Vol. IV. Modern History. 9s. each.

Verses, Wise or Otherwise. By ELLEN THORNEYCROFT FOWLER. 3s. 6d.

Vicat Cole, R.A., The Life and Paintings of. Illustrated. In Three Vols. £3 3s.

War and Peace, Memories and Studies of. By ARCHIBALD FORBES, LL.D. *Original Edition*, 16s. *Cheap Edition*, 6s.

Water-Colour Painting, A Course of. With Twenty-four Coloured Plates by R. P. LEITCH, and full Instructions to the Pupil. 5s.

Westminster Abbey, Annals of. By E. T. BRADLEY (Mrs. A. MURRAY SMITH). Illustrated. With a Preface by the DEAN OF WESTMINSTER. *Cheap Edition.* 21s.

Wild Birds, Familiar. By W. SWAYSLAND. Four Series. With 40 Coloured Plates in each. (In sets only, price on application.)

Wild Flowers, Familiar. By F. E. HULME, F.L.S., F.S.A. With 200 Coloured Plates and Descriptive Text. *Cheap Edition.* In Five Vols., 3s. 6d. each.

Wild Flowers Collecting Book. In Six Parts, 4d. each.

Wild Flowers Drawing and Painting Book. In Six Parts. 4d. each.

Wild Life at Home: How to Study and Photograph It. By RICHARD KEARTON, F.Z.S. Profusely Illustrated from Photographs, taken direct from Nature, by CHERRY KEARTON. 6s.

Windsor Castle, The Governor's Guide to. By the Most Noble the MARQUIS OF LORNE, K.T. Profusely Illustrated. Limp cloth, 1s. Cloth boards, gilt edges. 2s.

World of Wit and Humour, Cassell's New. With New Pictures and New Text. Complete in Two Vols., 6s. each.

With Claymore and Bayonet. By Col. PERCY GROVES. With 8 Plates. 3s. 6d.

Work. The Illustrated Journal for Mechanics. Half-Yearly Vols. 4s. each.

"Work" Handbooks. A Series of Practical Manuals prepared under the Direction of PAUL N. HASLUCK, Editor of *Work*. Illustrated. Cloth, 1s. each.

World of Wonders, The. With 400 Illustrations. *Cheap Edition.* Two Vols., 4s. 6d. each.

Young Blood. A Novel. By E. W. HORNUNG. 6s.

ILLUSTRATED MAGAZINES.

The Quiver. Monthly, 6d.

Cassell's Magazine. Monthly, 6d.

"Little Folks" Magazine. Monthly, 6d.

The Magazine of Art. Monthly, 1s. 4d.

Cassell's Saturday Journal. Weekly, 1d.; Monthly, 6d.

Chums. The Illustrated Paper for Boys. Weekly, 1d.; Monthly, 6d.

Work. The Journal for Mechanics. Weekly, 1d.; Monthly, 6d.

Building World. Weekly, 1d.; Monthly, 6d.

Cottage Gardening. Illustrated. Weekly, ½d.; Monthly, 3d.

The New Penny Magazine. 64 Large Pages (in Cover). Profusely Illustrated. Weekly, 1d.

*** *Full particulars of* CASSELL & COMPANY'S **Monthly Serial Publications** *will be found in* CASSELL & COMPANY'S COMPLETE CATALOGUE, which may be had at all Booksellers', or will be sent post free on application to the Publishers.

Educational Works and Students' Manuals.

Agricultural Text-Books, Cassell's. (The "Downton" Series.) Fully Illustrated. Edited by JOHN WRIGHTSON, Professor of Agriculture. **Soils and Manures.** By J. M. H. MUNRO, D.Sc. (London), F.I.C., F.C.S. 2s. 6d. **Farm Crops.** By Professor WRIGHTSON. 2s. 6d. **Live Stock.** By Professor WRIGHTSON. 2s. 6d.

Alphabet, Cassell's Pictorial. Mounted on Linen, with Rollers. 2s. Mounted with Rollers, and Varnished. 2s. 6d.

Arithmetic:—Howard's Art of Reckoning. By C. F. HOWARD. Paper, 1s.; cloth, 2s. *Enlarged Edition*, 5s.

Arithmetics, The "Belle Sauvage." By GEORGE RICKS, B.Sc. Lond. With Test Cards. (*List on application.*)

Atlas, Cassell's Popular. Containing 24 Coloured Maps. 1s. 6d.

Blackboard Drawing. By W. E. SPARKES. With 52 Full-page Illustrations by the Author. 5s.

Book-Keeping. By THEODORE JONES. FOR SCHOOLS, 2s.; or cloth, 3s. FOR THE MILLION, 2s.; or cloth, 3s. Books for Jones's System, Ruled Sets of, 2s.

British Empire Map of the World. New Map for Schools and Institutes. By G. R. PARKIN and J. G. BARTHOLOMEW, F.R.G.S. Mounted on cloth, varnished, and with Rollers or Folded. 25s.

Chemistry, The Public School. By J. H. ANDERSON, M.A. 2s. 6d.

Cookery for Schools. By LIZZIE HERITAGE. 6d.

Dulce Domum. Rhymes and Songs for Children. Edited by JOHN FARMER, Editor of "Gaudeamus," &c. Old Notation and Words, 5s. N.B.—The Words of the Songs in "Dulce Domum" (with the Airs both in Tonic Sol-Fa and Old Notation) can be had in Two Parts, 6d. each.

England, A History of. From the Landing of Julius Cæsar to the Present Day. By H. O. ARNOLD-FORSTER, M.P. *Revised Edition.* Fully Illustrated. 5s.

English Literature, A First Sketch of, from the Earliest Period to the Present Time. By Prof. HENRY MORLEY. 7s. 6d.

Euclid, Cassell's. Edited by Prof. WALLACE, M.A. 1s.

Euclid, The First Four Books of. *New Edition.* In paper, 6d.; cloth, 9d.

French, Cassell's Lessons in. *New and Revised Edition.* Parts I. and II., each 1s. 6d.; complete, 2s. 6d. Key, 1s. 6d.

French-English and English-French Dictionary. 3s. 6d. or 5s.

French Reader, Cassell's Public School. By GUILLAUME S. CONRAD. 2s. 6d.

Galbraith and Haughton's Scientific Manuals.
Astronomy. 5s. Euclid. Books I., II., III. 2s. 6d. Books IV., V., VI. 2s. 6d. Mathematical Tables. 3s. 6d. Optics. 2s. 6d. Hydrostatics. 3s. 6d. Algebra. Part I., cloth, 2s. 6d. Complete, 7s. 6d. Tides and Tidal Currents, with Tidal Cards, 3s.

Gaudeamus. Songs for Colleges and Schools. Edited by JOHN FARMER. 5s. Words only, paper, 6d.; cloth, 9d.

Geography, A Practical Method of Teaching (England and Wales). By J. H. OVERTON, F.G.S., 6d.

Geometry, First Elements of Experimental. By PAUL BERT. Illustrated. 1s. 6d.

German Dictionary, Cassell's. German-English, English-German. *Cheap Edition*, cloth, 3s. 6d.; half-morocco, 5s.

German Reading, First Lessons in. By A. JÄGST. Illustrated. 1s.

Hand and Eye Training. By GEORGE RICKS, B.Sc., and JOSEPH VAUGHAN. Illustrated. Vol. I. Designing with Coloured Papers. Vol. II. Cardboard Work. 2s. each. Vol. III. Colour Work and Design. 3s.

Hand and Eye Training. By G. RICKS, B.Sc. Two Vols., with 16 Coloured Plates in each. 6s. each. **Cards for Class Use.** Five Sets. 1s. each.

Historical Cartoons, Cassell's Coloured. Size 45 in. × 35 in., 2s. each. Mounted on canvas and varnished, with rollers, 5s. each. (Descriptive pamphlet, 16 pp., 1d.)

Italian Lessons, with Exercises, Cassell's. In One Vol. 2s.

Latin Dictionary, Cassell's. (Latin-English and English-Latin.) 3s. 6d.; half-morocco, 5s.

Latin Primer, The New. By Prof. J. P. POSTGATE. 2s. 6d.

Latin Primer, The First. By Prof. POSTGATE. 1s.

Latin Prose for Lower Forms. By M. A. BAYFIELD, M.A. 2s. 6d.

Laws of Every-Day Life. For the Use of Schools. By H. O. ARNOLD-FORSTER, M.P. 1s. 6d.

Little Folks' History of England. By ISA CRAIG-KNOX. Illustrated. 1s. 6d.

Making of the Home, The. By Mrs. SAMUEL A. BARNETT. 1s. 6d.

Map Building for Schools. A Practical Method of Teaching Geography; (England and Wales). By J. H. OVERTON, F.G.S. 6d.

Marlborough Books:—**Arithmetic Examples.** 3s. **French Exercises.** 3s. 6d. **French Grammar.** 2s. 6d. **German Grammar.** 3s. 6d.

Mechanics, Applied. By JOHN PERRY, M.E., D.Sc., &c. Illustrated. 7s. 6d.

Mechanics for Young Beginners. By the Rev. J. G. EASTON, M.A. *Cheap Edition*, 2s. 6d.

Mechanics and Machine Design, Numerical Examples in Practical. By R. G. BLAINE, M.E. *New Edition, Revised and Enlarged.* With 79 Illus. 2s. 6d.

Metric Charts, Cassell's Approved. Two Coloured Sheets, 42 in. by 22½ in. illustrating by Designs and Explanations the Metric System. 1s. each. Mounted with Rollers, 3s. each. The two in one with Rollers, 5s.

Models and Common Objects, How to Draw from. By W. E. SPARKES. Illustrated. 3s.

Models, Common Objects, and Casts of Ornament, How to Shade from. By W. E. SPARKES. With 25 Plates by the Author. 3s.

Natural History Coloured Wall Sheets, Cassell's New. Consisting of 16 subjects. Size, 39 by 31 in. Mounted on rollers and varnished. 3s. each.

Object Lessons from Nature. By Prof. L. C. MIALL, F.L.S., F.G.S. Fully Illustrated. *New and Enlarged Edition.* Two Vols. 1s. 6d. each.

Physiology for Schools. By ALFRED T. SCHOFIELD, M.D., M.R.C.S., &c. Illustrated. 1s. 9d. Three Parts, paper covers, 5d. each; or cloth limp, 6d. each.

Poetry for Children, Cassell's. 6 Books, 1d. each; or complete in One Vol., limp cloth, 6d.

Popular Educator, Cassell's. With Revised Text, New Maps, New Coloured Plates, New Type, &c. Complete in Eight Vols., 5s. each.

Readers, Cassell's "Belle Sauvage." An Entirely New Series. Fully Illustrated. Strongly bound in cloth. (*List on application.*)

Reader, The Citizen. By H. O. ARNOLD-FORSTER, M.P. Cloth, 1s. 6d.; also a Scottish Edition, cloth, 1s. 6d.

Readers, Cassell's Classical. Vol. I., 1s. 8d.; Vol. II., 2s. 6d.

Reader, The Temperance. By J. DENNIS HIRD. 1s. or 1s. 6d.

Readers, Cassell's "Higher Class." (*List on application.*)

Readers, Cassell's Readable. Illustrated. (*List on application.*)

Readers for Infant Schools, Coloured. Three Books. 4d. each.

Readers, Geographical, Cassell's New. With Numerous Illustrations in each Book. (*List on application.*)

Readers, The Modern Geographical. Illustrated throughout. (*List on application.*)

Readers, The Modern School. Illustrated. (*List on application.*)

Rolit. An entirely novel system of learning French. By J. J. TYLOR. 3s.

Round the Empire. By G. R. PARKIN. With a Preface by the Rt. Hon. the Earl of Rosebery, K.G. Fully Illustrated. 1s. 6d.

Science of Every-Day Life. By J. A. BOWER. Illustrated. 1s.

Sculpture, A Primer of. By E. ROSCOE MULLINS. Illustrated. 2s. 6d.

Shakspere's Plays for School Use. Illustrated. 9 Books. 6d. each.

Spelling, A Complete Manual of. By J. D. MORELL, LL.D. *Cheap Edition.* Cloth limp, 6d.

Technical Educator, Cassell's. A New Cyclopædia of Technical Education, with Coloured Plates and Engravings. Complete in Six Vols., 3s. 6d. each.

Technical Manuals, Cassell's. Illustrated throughout. 16 Vols., from 2s. to 4s. 6d. (*List free on application.*)

Technology, Manuals of. Edited by Prof. AYRTON, F.R.S., and RICHARD WORMELL, D.Sc., M.A. Illustrated throughout. (*List on application.*)

Things New and Old; or, Stories from English History. By H. O. ARNOLD-FORSTER, M.P. Fully Illustrated. Strongly bound in cloth. Seven Books from 5d. to 1s. 8d.

World of Ours, This. By H. O. ARNOLD-FORSTER, M.P. Fully Illustrated. *Cheap Edition.* 2s. 6d.

Young Citizen, The; or, Lessons in our Laws. By H. F. LESTER, B.A. Fully Illustrated. 2s. 6d. Also issued in Two Parts under the title of "Lessons in Our Laws." 1s. 6d. each.

Books for Young People.

Whys and other Whys; or, Curious Creatures and Their Tales. By S. H. HAMER and HARRY B. NEILSON. Coloured Boards, 5s.

Micky Magee's Menagerie; or, Strange Animals and their Doings. By S. H. HAMER. With 8 Coloured Plates and other Illustrations by HARRY B. NEILSON. Coloured Boards, 1s. 6d.

Two Old Ladies, Two Foolish Fairies, and a Tom Cat. The Surprising Adventures of Tuppy and Tue. A New Fairy Story. By MAGGIE BROWNE. With Four Coloured Plates and Illustrations in text. Cloth, 3s. 6d.

The Victoria Painting Book for Little Folks. Containing about 300 Illustrations suitable for Colouring, 1s.

"Little Folks" Half-Yearly Volume. Containing 480 pages of Letterpress, with Six Full-page Coloured Plates, and numerous other Pictures printed in Colour. Picture boards, 3s. 6d.; or cloth gilt, gilt edges, 5s.

Bo-Peep. A Treasury for the Little Ones. Yearly Vol. With Original Stories and Verses. Illustrated with Eight Full-page Coloured Plates, and numerous other Pictures printed in Colour. Elegant picture boards, 2s. 6d.; cloth, 3s. 6d.

Beneath the Banner. Being Narratives of Noble Lives and Brave Deeds. By F. J. CROSS. *Revised and Enlarged Edition.* Illustrated. Limp cloth, 1s.; cloth boards, 2s.

Good Morning! Good Night! Morning and Evening Readings for Children, by F. J. CROSS. Illustrated. Limp cloth, 1s.; cloth boards, 2s.

On Board the *Esmeralda*; or, Martin Leigh's Log. By JOHN C. HUTCHESON. Illustrated. *Cheap Edition.* 1s. 6d.

Notable Shipwrecks. *Cheap Edition. Revised and Enlarged.* Limp cloth, 1s.

Five Stars in a Little Pool. By EDITH CARRINGTON. Illustrated. 3s. 6d.

Merry Girls of England. By L. T. MEADE. 3s. 6d.

Beyond the Blue Mountains. By L. T. MEADE. Illustrated. 5s.

The Cost of a Mistake. By SARAH PITT. Illustrated. *New Edition.* 2s. 6d.

A Book of Merry Tales. By MAGGIE BROWNE. Illustrated. 3s. 6d.

A Sunday Story-Book. By MAGGIE BROWNE. Illus. 3s. 6d.

Story Poems for Young and Old. By E. DAVENPORT. 3s. 6d.

Pleasant Work for Busy Fingers. By MAGGIE BROWNE. Illustrated. 2s. 6d.

Magic at Home. By Prof. HOFFMAN. Fully Illustrated. 3s. 6d.

Little Mother Bunch. By Mrs. MOLESWORTH. Illustrated. *New Edition.* 2s. 6d.

Heroes of Every-Day Life. By LAURA LANE. Illustrated. 2s. 6d.

Ships, Sailors, and the Sea. By R. J. CORNEWALL-JONES. Illd. 2s. 6d.

Gift Books for Young People. By Popular Authors. With Four Original Illustrations in each. Cloth gilt, 1s. 6d. each.

The Boy Hunters of Kentucky. By Edward S. Ellis.

Red Feather a Tale of the American Frontier. By Edward S. Ellis.

Fritters; or, "It's a Long Lane that has No Turning."

Trixy; or, "Those who Live in Glass Houses shouldn't Throw Stones."

Rhoda's Reward.

Jack Marston's Anchor.

Frank's Life-Battle.

Major Monk's Motto; or, "Look Before you Leap."

Tim Thomson's Trial; or, "All is not Gold that Glitters."

Ruth's Life-Work; or, "No Pains, no Gains."

Uncle William's Charges.

"Golden Mottoes" Series, The. Each Book containing 208 pages, with Four Full-page Original Illustrations. Crown 8vo, cloth gilt, 2s. each.

"Nil Desperandum." By the Rev. F. Langbridge, M.A.

"Bear and Forbear." By Sarah Pitt.

"Foremost if I Can." By Helen Atteridge.

"Honour is my Guide." By Jeanie Hering (Mrs. Adams-Acton).

"Aim at a Sure End." By Emily Searchfield.

"He Conquers who Endures." By the Author of "May Cunningham's Trial," &c.

"Cross and Crown" Series, The. With Four Illustrations in each Book. Crown 8vo, 256 pages, 2s. 6d. each.

Heroes of the Indian Empire; or, Stories of Valour and Victory. By Ernest Foster.

Through Trial to Triumph; or, "The Royal Way." By Madeline Bonavia Hunt.

Strong to Suffer: A Story of the Jews. By E. Wynne.

By Fire and Sword: A Story of the Huguenots. By Thomas Archer.

Adam Hepburn's Vow: A Tale of Kirk and Covenant. By Annie S. Swan.

No. XIII.; or, The Story of the Lost Vestal. A Tale of Early Christian Days. By Emma Marshall.

Freedom's Sword: A Story of the Days of Wallace and Bruce. By Annie S. Swan.

"Peeps Abroad" Library. *Cheap Editions.* Cloth gilt, 2s. 6d. each.

Rambles Round London. By C. L. Matéaux. Illustrated.
Around and About Old England. By C. L. Matéaux. Illustrated.
Paws and Claws By one of the Authors of "Poems Written for a Child." Illustrated.
Decisive Events in History. By Thomas Archer With Original Illustrations.
The True Robinson Crusoes.
Peeps Abroad for Folks at Home. Illustrated throughout.
Wild Adventures in Wild Places. By Dr. Gordon Stables, R.N. Illustrated.
Modern Explorers. By Thomas Frost. Illustrated. *New and Cheaper Edition.*
Early Explorers. By Thomas Frost.
Home Chat with our Young Folks. Illustrated throughout.
Jungle, Peak, and Plain. Illustrated throughout.

Three-and-Sixpenny Books for Young People. With Original Illustrations. Cloth gilt, 3s. 6d. each.

Told Out of School. By A. J. Daniels.
† Red Rose and Tiger Lily. By L. T. Meade.
The Romance of Invention. By James Burnley.
† Bashful Fifteen. By L. T. Meade.
The King's Command. A Story for Girls. By Maggie Symington.
† A Sweet Girl Graduate. By L. T. Meade.
† The White House at Inch Gow. By Sarah Pitt.
† Polly. By L. T. Meade.
† The Palace Beautiful. By L. T. Meade.
"Follow my Leader."
For Fortune and Glory.
Lost Among White Africans.
† A World of Girls. By L. T. Meade.

Books marked thus † can also be had in extra cloth gilt, gilt edges, 5s. each.

Books by Edward S. Ellis. Illustrated. Cloth, 2s. 6d. each.

Scouts and Comrades, or Tecumseh, Chief of the Shawanoes.
Klondike Nuggets.
Cowmen and Rustlers.
A Strange Craft and its Wonderful Voyage.
Pontiac, Chief of the Ottawas. A Tale of the Siege of Detroit.
In the Days of the Pioneers.
The Phantom of the River.
The Great Cattle Trail.
Shod with Silence.
The Path in the Ravine.
The Hunters of the Ozark.
The Camp in the Mountains
Ned in the Woods. A Tale of Early Days in the West.
Down the Mississippi.
The Last War Trail.
Ned on the River. A Tale of Indian River Warfare.
Footprints in the Forest.
Up the Tapajos.
Ned in the Block House. A Story of Pioneer Life in Kentucky.
The Young Ranchers.
The Lost Trail.
Camp-Fire and Wigwam.
Lost in the Wilds.
Lost in Samoa. A Tale of Adventure in the Navigator Islands.
Tad; or, "Getting Even" with Him.

Books by Edward S. Ellis. Illustrated. 1s. 6d. each.

Astray in the Forest.
Captured by Indians.
Wolf Ear the Indian.
The Daughter of the Chieftain.
The Boy Hunters of Kentucky.
Red Feather.

Cassell's Picture Story Books. Each containing 60 pages. 6d. each.

Little Talks.
Bright Stars.
Nursery Joys.
Pet's Posy.
Tiny Tales.
Daisy's Story Book.
Dot's Story Book.
A Nest of Stories.
Good-Night Stories.
Chats for Small Chatterers.
Auntie's Stories.
Birdie's Story Book.
Little Chimes.
A Sheaf of Tales.
Dewdrop Stories.

Illustrated Books for the Little Ones. Containing interesting Stories. All Illustrated. 9d. each.

Bright Tales and Funny Pictures.
Merry Little Tales.
Little Tales for Little People.
Little People and Their Pets.
Tales Told for Sunday.
Sunday Stories for Small People.
Stories and Pictures for Sunday.
Bible Pictures for Boys and Girls.
Firelight Stories.
Sunlight and Shade.
Rub-a-dub Tales.
Fine Feathers and Fluffy Fur.
Scrambles and Scrapes.
Tittle Tattle Tales.
Dumb Friends.
Indoors and Out.
Some Farm Friends.
Those Golden Sands.
Little Mothers and their Children.
Our Schoolday Hours.
Creatures Tame.
Creatures Wild.
Up and Down the Garden.
All Sorts of Adventures.
Our Holiday Hours.
Wandering Ways.

Shilling Story Books. All Illustrated, and containing Interesting Stories.

Seventeen Cats.
Bunty and the Boys.
The Heir of Elmdale.
Thorns and Tangles.
The Cuckoo in the Robin's Nest.
John's Mistake.
Surly Bob.
The History of Five Little Pitchers.
The Giant's Cradle.
Shag and Doll.
The Cost of Revenge.
Clever Frank.
Among the Redskins.
The Ferryman of Brill.
Harry Maxwell.

Eighteenpenny Story Books. All Illustrated throughout.

Wee Willie Winkie.
Ups and Downs of a Donkey's Life.
Three Wee Ulster Lassies.
Up the Ladder.
Dick's Hero; & other Stories.
The Chip Boy.
Roses from Thorns.
Faith's Father.
By Land and Sea
Jeff and Leff.
The Young Berringtons.
Tom Morris's Error.
"Through Flood—Through Fire."
The Girl with the Golden Locks.
Stories of the Olden Time.

Library of Wonders. Illustrated Gift-books for Boys. Cloth, 1s. 6d.

Wonders of Animal Instinct.
Wonders of Bodily Strength and Skill.
Wonderful Balloon Ascents.

Albums for Children. With Full-page Illustrations. 3s. 6d. each.

The Album for Home, School, and Play.
My Own Album of Animals.
Picture Album of All Sorts. Illustrated.
The Chit-Chat Album. Illustrated.

"Wanted—a King" Series. *Cheap Edition.* Illustrated. 2s. 6d. each.

Fairy Tales in Other Lands. By Julia Goddard.
Robin's Ride. By Ellinor Davenport Adams.
Wanted—a King; or, How Merle set the Nursery Rhymes to Rights. By Maggie Browne.

The "World in Pictures" Series. Illustrated throughout. *Cheap Edition.* 1s. 6d. each.

All the Russias.
Chats about Germany.
Peeps into China.
The Land of Pyramids (Egypt).
The Eastern Wonderland (Japan).
Glimpses of South America.
The Land of Temples (India).
The Isles of the Pacific.

Two-Shilling Story Books. All Illustrated.

Stories of the Tower.
Mr. Burke's Nieces.
The Top of the Ladder: How to Reach it.
Little Flotsam.
The Children of the Court.
The Four Cats of the Tippertons.
Little Folks' Sunday Book.
Poor Nelly.
Aunt Tabitha's Waifs.
In Mischief Again.
Peggy, and other Tales.

Books for the Little Ones. Fully Illustrated.

The Sunday Scrap Book. With Several Hundred Illustrations. Boards, 3s. 6d. cloth, gilt edges, 5s.
Cassell's Robinson Crusoe. With 100 Illustrations. Cloth, 3s. 6d.; gilt edges, 5s.
Cassell's Pictorial Scrap Book. In Six Books. 6d. each.
The Old Fairy Tales. With Original Illustrations. Cloth, 1s.
Cassell's Swiss Family Robinson. Illustrated. Cloth, 3s. 6d.; gilt edges, 5s.
The New "Little Folks" Painting Book. Containing nearly 350 Outline Illustrations suitable for Colouring. 1s.

The World's Workers. A Series of New and Original Volumes by Popular Authors. With Portraits printed on a tint as Frontispiece. 1s. each.

John Cassell. By G. Holden Pike.
Charles Haddon Spurgeon. By G. Holden Pike.
Dr. Arnold of Rugby. By Rose E. Selfe.
The Earl of Shaftesbury.
Sarah Robinson, Agnes Weston, and Mrs. Meredith.
Florence Nightingale, Catherine Marsh, Frances Ridley Havergal, Mrs. Ranyard ("L.N.R."). By LIZZIE ALLDRIDGE. (To be had bound up in 3s. vol. only.)
Mrs. Somerville and Mary Carpenter.
General Gordon.
Charles Dickens.
Thomas A. Edison and Samuel F. B. Morse.
Sir Titus Salt and George Moore.
Dr. Guthrie, Father Mathew, Elihu Burritt, Joseph Livesey.
Sir Henry Havelock and Colin Campbell, Lord Clyde.
Abraham Lincoln.
David Livingstone.
George Müller and Andrew Reed.
Richard Cobden.
Benjamin Franklin.
Handel.
Turner the Artist.
George and Robert Stephenson.

*** *The above Works can also be had Three in One Vol., cloth, gilt edges, 3s.*

CASSELL & COMPANY, Limited, Ludgate Hill, London; Paris, New York & Melbourne.

UNIVERSITY OF CALIFORNIA LIBRARY
Los Angeles
This book is DUE on the last date stamped below.

REC'D LD-URL
LD
URL
APR 10 1984
MAR 23 1984

3 1158 00862 9957

UC SOUTHERN REGIONAL LIBRARY FACILITY
A 000 105 705 8

ST